BULLETIN OF MISCELLANEOUS INFORMATION No. 4 1939
ROYAL BOTANIC GARDENS, KEW

XVIII—THE OCA AND ITS VARIETIES. A. W. Hill.

Oxalis tuberosa Mol., the Oca of the Bolivian Indians living round about Lake Titicaca, is a staple article of diet on the plateau.

The tubers grow to the size of medium-sized potatoes, some 2 to 3 inches long and 1 to 1½ inches in diameter ; they are usually cylindrical or somewhat turbinate in shape. The fleshy, overlapping leaf-scales give the tubers a cone-like appearance and conceal the buds in the deep-set " eyes." In general appearance they are very similar to some of the deep-eyed potatoes grown in the Bolivian Andes.*

The tubers contain large quantities of calcium oxalate, and before they are eaten they are usually dried in the sun and then frozen, and in fact are treated in much the same way as are the potatoes of that region when dried to form " Chuño."

Ocas are grown extensively in fields and on the hillside terraces in Bolivia and are always reproduced from tubers and never from seed. In fact, according to information given me in Bolivia, the plants never set seed, though no doubt it would be possible to induce seed-setting were there anyone there competent to fertilize the flowers, and also to collect the seed. This perpetual vegetative reproduction has given rise to some interesting results, which I believe have no exact parallel in other plants.

The flowers of *Oxalis tuberosa* are trimorphic, and when I was in Bolivia in January and February 1903 I was frequently passing by fields and terraces planted with Ocas which were then in their full vigour and often gay with the conspicuous orange-yellow flowers.

Being interested to see how the proportions of the different types of flowers might work out, I examined numbers of flowers in the various plots and to my surprise found the flowers in any one plot to be all of the same type, either long-, short-, or mid-styled ! On enquiry from my Bolivian servant and telling him that all the Ocas in the plot were the same according to their flowers, his rejoinder was that of course they were the same as this field was planted with white Ocas, that with yellow, while in another plot they were all red Ocas. Up till then I had not seen the tubers except in the colourless dried condition as sold in the market at La Paz, but on enquiry from the Corregidor of the village of Escoma, on the N.E. side of Lake Titicaca, I was informed that four kinds of Oca are cultivated—the bitter, the sweet or yellow, the white and

* See Salaman, Journ. Roy. Hort. Soc. **62**, 61, 1938.

the red. The names of the three latter varieties refer to the colour of the tubers, the yellow and red ones being well-marked. It is not always easy to say whether the white variety is a very pure one as regards colour as the tubers sometimes have a yellowish tinge, but the white ones can easily be distinguished from the yellow, since the scales of the latter always have a red edge, while those of the white tubers are colourless. Unfortunately I did not ascertain the tuber colour of the " bitter " variety.

From my examination of the cultivated plots, I found that the yellow tuber variety bore only long-styled flowers, the white tuber variety had mid-styled flowers, while the short-styled flowers were borne by the red tuber variety. Thus it would appear in the course of the long cultivation of this edible tuber the selection of colour forms has been accompanied by a segregation of flower types corresponding to the different coloured tubers.

In addition to the association of the three forms of the trimorphic flowers with three distinct types of tuber, there are also some differences in leaf and stem colour, leaf hairiness, and in the petal colour of the varietal forms.

In the white tuber variety the stems and leaves are uniformly green of rather a pale shade, and under cultivation in this country the plants can easily be distinguished by their leaves from the other two varieties.

The stems of the yellow tuber variety are reddish in colour, especially so in the younger shoots, while the leaves are a deep claret-red on their lower surfaces. The red colour is also visible to some extent on the upper surface giving the leaves a darker green tint than those of the " white " variety. The leaves and stems are also more hairy than those of the other two forms.

In the red tuber form the stems are also reddish in colour, but the leaves are green and only a trace of red can be detected occasionally on a few of the leaves.

As to the flowers, those borne by the long-styled variety (yellow tubers), could easily be distinguished in the field by the prominence of the red veins of the petals.

These observations made so long ago I had hoped to be able to confirm by studying the behaviour of the plants under cultivation in England, and tubers of the three colour varieties were brought back for the purpose on my return from Bolivia and Peru in 1903. They grew well at the Cambridge Botanic Garden in the open and formed strong plants, but unfortunately failed to produce any flowers. More recently the experiment has been repeated with tubers sent over from Bolivia by a former Kew student gardener employed on the Bolivian section of the Antofagasta-Bolivia railway. He has confirmed my observations as to the segregation of the types of flower with tuber colour, but again efforts to induce the plants raised from these tubers to flower have not been very successful.

The Bolivian Plateau being situated at some 13,000 to 14,000 feet altitude, between 16° and 17° S. lat., it seemed possible that both altitude and length of day might be directly associated with the flowering of the plants.

In order to test whether these two factors could be in any way imitated in the northern hemisphere, plants have been kindly grown for me under restricted daylight conditions at the Royal Horticultural Society's Gardens, Wisley, by Dr. M. A. Tincker, and also at high altitudes in the Austrian Tyrol, thanks to the kindness of Mr. A. Beer, Curator of the Botanic Gardens, Innsbruck. Both ventures have resulted in some success, but not so good as was hoped might be the case.

Under a twelve-hour day at Wisley, which approximates to the length of day in Bolivia, a few flowers have been produced on the white-tuber bearing varieties, but none on the plants with yellow or red tubers. Dr. R. N. Salaman at Barley, Herts., was more successful and flowered plants from yellow tubers, the flowers being long-styled, and also from white tubers, which bore mid-styled flowers; in both cases according to expectation.

Some of the plants grown in the mountains near Innsbruck, Austria, flowered well, especially those from the yellow and white tubers. The flowers of the white tuber plants were mid-styled, but those of the yellow tuber ones were all short-styled. This result was contary to expectation, but tubers from plants which flowered have been sent back from Austria, together with pressed flowers, and these prove that the observations were correct. In Bolivia Mr. Wolstenholme, the Kew student gardener who sent over material, has confirmed my own observations that plants from the yellow tubers bear long-styled flowers, but he found that the flowers from red tubers were not always true to expectation, for in some cases the styles were short, while in others they were in the mid-position; the white tubers, however, were consistent in yielding flowers with mid-length styles.

These experiments, as far as they go, suggest that the segregation of flower type in relation to tuber colour is not as fixed as it seemed to be when the plants were examined by me in the field, except that the white tubers do definitely appear to be associated with the mid-styled flowers.

According to my field-notes, plants with short styles were rare in the Oca fields I examined in Bolivia in 1903. At Ancoraimes only long- and mid-styled flowers were found, while at Copacabana the flowers were mid- and short-styled. Near Escoma, long- and mid-styled were found in about equal numbers. The following note is taken from my diary written at Huaycho, N.E. side of Lake Titicaca, (Feb. 15th, 1903): "In a field of Ocas I picked flowers at random and all were mid-styled, they seem in cultivation to have separated up the species into varieties which are characterized by the different forms of flower."

It seems probable that in some cases in Bolivia the farmers had unconsciously selected pure breeding strains of Ocas, so that in their fields the yellow tubers all bore long-styled, the white mid-styled, and the red short-styled flowers, while other farmers in the case of the red and yellow tubers had not selected such pure-breeding races; though in all cases the mid-styled flowers appear definitely to be linked with the white tubers.

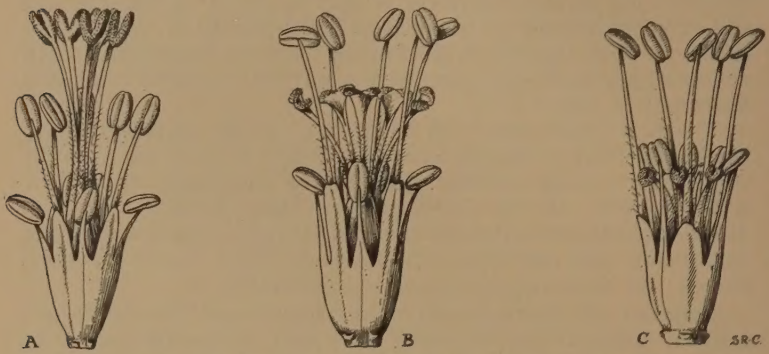

Fig. 1. *Oxalis tuberosa*, androecium and gynoecium. A, from plant with yellow tubers, ×6. B, from plant with white tubers, ×6. C, from plant with red tubers, ×6.

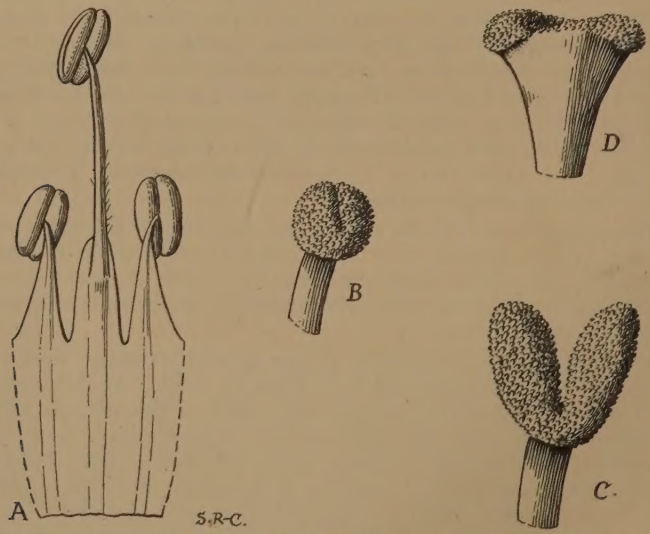

Fig. 2. *Oxalis tuberosa*. A, part of androecium, from inside, ×12. B, stigma from short style, ×24. C, stigma from long style, ×24. D, stigma from medium length style, ×24.

The relative positions of the whorls of stamens and styles is well shown in the accompanying figure (fig. 1). Attention should be drawn to the different character of the processes or broadened filaments between the stamens of the lowest whorl, to which the longer stamens are attached, since they vary considerably both in length and in the bluntness or acuteness of their apices.

The most striking difference between the three forms of flower, however, is shown in the stigmas which in the short-styled flowers are rounded, knob-like organs with a central groove, while in the mid-styled flowers the style broadens at the apex and bears two almost separate stigmatic discs connected together by a slightly stigmatic intermediate zone. In the long-styled flowers the stigma has become much enlarged and consists of two large erect stigmatic lobes which form a U-shaped organ (fig. 2).

It has seemed worth while to record these observations and experiments though, unfortunately, they are inconclusive, nor will it be possible apparently to complete the observations without carrying out further investigations in Bolivia since the plants so rarely flower in this country. It was hoped that they might flower in Kenya, but tubers sent to the Colony have behaved much as they do in England and no flowers have been recorded there.

This long-cultivated economic *Oxalis* would doubtless yield some interesting results could it be studied on genetical lines in its native country.

XIX—THE OCCURRENCE OF ASTELIA NERVOSA IN VICTORIA.

J. H. Willis (Victorian Forests Commission).

Dr. C. Skottsberg of Sweden has recently published a comprehensive monograph* of the genus *Astelia* and its two allies, *Milligania* (confined to Tasmania) and *Collospermum* (New Zealand, Samoa and Fiji). Twenty-three species and four distinct varieties of *Astelia*, comprising seven subgenera, are described and figured in the monograph which includes maps to indicate the circumpolar distribution and probable antarctic origin of this interesting group of lilies. New Zealand with nine species and three varieties has a richer *Astelia* flora than any other region and is a likely centre of development and past migration. The genus also occurs in Tasmania, south-eastern Australia, northern Papua, New Caledonia, the Marquesas Islands, the Society Group, and antarctic America, with at least six species in Hawaii (a northerly outpost) and one isolated representative in the Island of Reunion (east of Africa). Later†, the same author added a new-discovered species from the island of Rapa. It is related to the species from Hawaii and Marquesas Is.

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*Kungliga Svenska Vetenskapsakademiens Handlingar, ser. 3, **14**, no. 2 (1934).

†B. P. Bishop Mus. Occas. Papers, **13**, no. 18 (1937).

Such Australian material of *Astelia* as was preserved in collections at the Victorian National Herbarium was forwarded to Dr. Skottsberg for examination in 1934. The result of his research, embodied in his monograph, discloses that Robert Brown's *Astelia alpina* (the only Australian species hitherto recorded) actually embraced two widely-differing species and a well defined variety. Dr. Skottsberg limits the typical *A. alpina* (subgenus *Euastelia*) to mountain regions in southern and western Tasmania and makes the continental form *A. alpina* var. *novae-hollandiae* (on mountains from the Victorian Baws-Baws to Kosciusko in New South Wales). He restored *A. psychrocharis* F. Muell. from Mt. Kosciusko and the sources of the Murray River. It had erroneously been merged into *A. alpina*, but belongs to subgenus *Tricella*. These forms are all dwarf plants a few inches in height.

In addition there occurs in Australia a large *Astelia*, but no record of this had been published when the monograph was prepared. In December 1929, male and female specimens of this large *Astelia*—up to six feet high—were gathered by the author at the head waters of the Latrobe River (about 3 miles S.E. of Powelltown, Victoria). Five years later, in the head of McCrae's Creek, Beenak (6 miles S.W. of Powelltown), the author found another small colony of similar plants, containing three inflorescences in full berry. Since no male flower-heads were in evidence, it would seem that self-pollination had occurred, especially as the flowers bore stamens with small withered anthers. Subsequently, numerous and larger colonies were found in several fern-gullies along the Bunyip-Latrobe divide, where the annual rainfall is in the vicinity of 50 inches. These *Astelia* colonies usually occur in association with the Myrtle Beech (*Nothofagus Cunninghamii*) and occupy steep granite gullies at elevations of about 2000 feet, but they descend to lower than 1000 feet in the Tomahawk Creek, Beenak (35 miles east of Melbourne) where *Nothofagus* is absent; the habitat is invariably wet or marshy ground at the water's edge.

Recognizing the affinities of this plant with certain species of *Astelia* in New Zealand, material was forwarded to Dr. H. H. Allan of Palmerston, N.Z., who kindly examined it in comparison with the various New Zealand forms. While regarding the Australian plant as distinct from any species occurring in New Zealand, Dr. Allan (*in litt.*) indicated its relationship with *A. nervosa* and *A. Cockaynei*.

Material was also forwarded to the Royal Botanic Gardens at Kew. As no material in the Kew Collections matched the Australian specimens, they were referred to Dr. Skottsberg, who reported that the plant

"Belongs to subgenus *Tricella* and the *nervosa*-group. Stands close to *A. nervosa typica* and must be very like it in size and width of leaves, and the differences between the male plants seem very small, except that the Australian form is odourless, whereas the

other is described as fragrant and sweet-scented. The tube appears to be a little less high in this and the pedicels shorter.

" The differences in the female are more conspicuous. The Australian variety has a much less developed fleshy perianth tube, which is coloured yellowish, not red, within. It is as much as 4–5 or even 6 mm. high in *nervosa* and var. *silvestris*, and campanulate, tightly surrounding the lower half of the fruit, but hardly over 3 mm. in Mr. Willis' plant and more open. The perianth segments are larger in this, and so are the staminodes. The seeds are more numerous and smaller ; a great many, from fruits picked out at random, have been carefully measured with a Leitz 0·1 mm. scaled tube.

" It is possible that the closest connexion is with var. *chathamica*, of which, however, the material in herbaria is incomplete, as seen from the table. The perianth tube in this seems as small as in the new variety. The style of *chathamica* is slightly more developed than in *nervosa* and *silvestris* but shorter than in the new one. The leaves, as far as known, are narrower in *chathamica*, and the seeds decidedly fewer and larger.

" As far as I can see, the Australian form should be classified as a distinct variety of *A. nervosa*, not as a new species."

Having personally examined *A. nervosa* Banks & Solander ex Hook. fil. (labelled *A. grandis* Hook. fil. ex T. Kirk) and *A. nervosa* var. *chathamica* (also labelled *A. grandis* in the National Herbarium, Melbourne), the author endorses Dr. Skottsberg's opinion. The type of *A. nervosa* differs from the Victorian form in its much more compressed female inflorescence, in its smaller, more tubular flowers, undeveloped style, and absence of staminodial filaments. The Victorian plant is certainly more like var. *chathamica*, but has wider leaves, a more spreading perianth, a longer style and smaller, more numerous seeds ; *chathamica* is described as favouring open places, whereas the Victorian form occurs in dense rain forest.

Following Dr. Skottsberg's suggestion, the author proposes to name this plant *Astelia nervosa* var. *australiana*. Appended is a brief description of the new variety together with a table of comparative measurements of the variety and its allies, kindly supplied by Dr. Skottsberg.

Astelia nervosa *Banks et Solander ex Hook. fil.* var. **australiana** *J. H. Willis*, var. nov. a typo floribus inodoris, perianthii feminei tubo breviori, segmentis majoribus differt. A var. *chathamica* foliis latioribus, seminibus minoribus numerosioribus recedit.

Plants dioecious, robust, up to 6 feet (1·8 m.) high. Leaves 50–200 cm. long and 5–10 cm. broad at base, linear-lanceolate, channelled, with drooping ends ; mid-rib and two marginal veins prominent, pale green. Male and female inflorescences stout, similar, 20–40 cm. high, covered with a loose, white, silky tomentum. Flowers odourless, olive-green or tinged with red, sub-tomentose outside. Fleshy perianth-tube of female flowers short (about

3 mm. high), yellowish within, not tightly enclosing the berry. Female segments narrow-oblong, spreading, recurved, 5·5–6·5 by 2–3·5 mm. Staminodial anthers 0·8–0·9 mm. broad, on filaments 1–1·2 mm. long. Pistil 5–7 by 3–4 mm. Style definite, 2 mm. long, with three swollen stigmatic apices. Berry bright orange, soon falling, 6–10 mm. long. Seeds 5–12, about 2·5 by 1·4 mm.

TABLE OF COMPARATIVE MEASUREMENTS
(from Dr. C. Skottsberg).

	A. nervosa var. *australiana*	*A. nervosa* var. *typica*	*A. nervosa* var. *silvestris*	*A nervosa* var. *chathamica*
Male inflorescence:				
Maximum length of racemes	18 cm.	27 cm.	18 cm.	12 cm.
Length of pedicels	7·5–10 mm.	5–8 mm.	5–7 mm.	6–7 mm.
Height of perianth tube	2–2·5 mm.	1·5–2 mm.	1·5–2 mm.	1 mm.
Female inflorescence:				
Size of lowest spathe	40 by 4 cm.	60–120 by 3·5–5·2 cm.	30–140 by 1·5–3·5 cm.	22 by 4 cm.
Maximum length of racemes	21 cm.	19 cm.	14 cm.	13 cm.
Length of pedicels	3–5 mm.	2–5 mm.	2–4 mm.	4–6 mm.
Height of perianth tube	2·5–3 mm.	3–5 mm.	3–6 mm.	8 mm.
Size of perianth segments	5·5–6·5 by 2–3·5 mm.	3–5·5 by 1–3 mm.	3–5·5 by 1·5–4 mm.	4–6 by 2–3 mm.
Length of staminodes (inc. anther)	1·3–1·4 mm.	1–1·2 mm.	1–1·2 mm.	—
Size of pistil ...	5–7 by 3–4 mm.	4–5 by 2·5–3·5 mm.	4–5 by 2·5–3·5 mm.	4–6 by 2·5–4 mm.
Length of style ...	2 mm.	1 mm.	1 mm.	1·2–1·5 mm.
Number of seeds ...	5–12	4–5	4–8	4–7
Average size of seeds	2·5 by 1·4 mm.	3·2 by 1·8 mm.	2·8 by 1·8 mm.	3·5 by 1·75 mm.

The close relationship of the Victorian form to the widespread and variable *A. nervosa* in New Zealand might suggest that it is an introduction and has escaped from cultivation. However, the author is informed by old settlers in the Beenak Parish that the form under discussion was abundant in virgin forest when they settled there. Further, the distinct morphological characters of the Victorian form and its fairly widespread occurrence in isolated colonies in a definite habitat, negative the idea that it is an introduction.

XX—DECADES KEWENSES. Plantarum Novarum in Herbario Horti Regii Conservatarum. Decas CXXXIII.

1321. **Frankenia** (§ **Pubescentes**) **hispidula** *Summerhayes* [Frankeniaceae] ; a ceteris speciebus sectionis ovulis pro placenta pluribus parietalibus differt.

Fruticulus compactus, 25–45 cm. altus ; caules lignosi, ± erecti, fastigiatim ramosi, ut rami juventute laxiuscule patentim hispiduli, demum glabrescentes, cortice cinereo vel cinereo-brunneo obtecti, internodiis usque ad 2·5 cm. longis. *Folia* breviter petiolata, ± patentia, oblonga, lanceolato-oblonga vel lineari-oblonga, obtusa, marginibus valde revolutis, usque ad 7 mm. longa et 2·5 mm. lata, utrinque dense hispidulo-pubescentia, glandulis punctata ; petiolus circiter 0·5 mm. longus ; vagina ciliata, extra pubescens. *Dichasia* pluries furcata, brevia, floribus subglomeratis. *Bracteae et bracteolae* longiuscule petiolatae, lanceolatae vel elliptico-ovatae, apice subobtusae vel rotundatae, basi (praesertim bracteae) ± cordatae vel rotundatae, petiolis exclusis usque ad 5 mm. longae et 4 mm. latae, supra densiuscule hispidulae vel longe pubescentes, subtus superne et costa sparse hispidulae ; petiolus 1–2 mm. longus, hispidulus ; vagina communis breviter hispidula. *Calyx* fusiformi-cylindricus, circiter 1 cm. longus, medio 2–3 mm. diametro, valde 5-costatus, extra praesertim costis hispidulus, intus fere glaber ; lobi ovato-triangulares, apice subulato-cuspidati, 1·5–2 mm. longi, conduplicati. *Petala* 5, ex ungue sursum sensim dilatato anguste obovato-spathulata, 1·5–1·8 cm. longa ; limbus 8–9 mm. longus, 5–6 mm. latus ; ligula 7–8 mm. longa, apice obtusa per 1 mm. libera. *Stamina* 6 ; filamenta linearia, 9–11 mm. longa, inferne circiter 0·5 mm. lata ; anthera 1·5 mm. longa. *Ovarium* elongato-ovoideum, 2–2·5 mm. longum, trimerum ; styli pars communis circiter 7·5 mm. longa ; rami 3, in toto 1·5–2 mm. longi, parte stigmatifera vix vel leviter incrassata 0·5–0·7 mm. longa ; ovula parietalia 4–5 pro placenta, 0·5–0·6 mm. longa. *Fructus* et semina non visa.

Western Australia. North West Division, Minilya River, on stony flint hills, 31 August, 1931, *C. A. Gardner* 3273.

This remarkable plant is of considerable interest from two standpoints. Firstly, it is the first member of series *Pubescentes* discovered possessing more than 2 distinctly parietal ovules to each carpel, since in *F. densa* Summerh. there are at the most 2 ovules to each placenta and these arise very near the base of the ovary, although

not truly basal. In indumentum, leaf-shape and other general features the species seems to fit well into series *Pubescentes* and indeed is very similar superficially to *F. serpyllifolia* Lindl. It might perhaps be placed in series *Intermediae* but I do not feel that this is a natural group. *F. hispidula* may indeed be looked upon as the "toichogonial" (or many-ovulate) representative of series *Pubescentes* and its inclusion in this series is paralleled by similar occurrences in several other series of Australian Frankenias.

Secondly, no member of this series has previously been found so far west, *F. densa*, which occurs along the Australian Bight, being the only other Western Australian member. However, there is still much to be discovered about the Frankenias of the interior of Australia and it may be that other representatives of the series will be found to link up the new species with its eastern relatives.

1322. **Elaeocarpus costatus** *M. R. F. Taylor* [Tiliaceae]; affinis *E. dentatae* Vahl sed foliis minoribus, inflorescentiis pauciflоris, petalis apicem versus vix latis, ovario 3-loculari, drupis majoribus suffuso-caeruleis putamine manifeste 6-costato.—*Elaeocarpus sp.* J. H. Maiden in Proc. Linn. Soc. N.S. Wales, **27**, 347. t. 15 (1902).

Arbor circiter 6·5 m. alta. *Ramuli* teretes, juniores leviter adpresse sericeo-villosi, cicatricibus foliorum delapsorum notati; cortex rugosus, brunneus vel ferrugineo-brunneus. *Folia* ad apices ramorum congesta, alterna, junioria leviter adpresse sericeo-villosa; petiolus 1–1·5 cm. longus, canaliculatus, apice inferne turgidus; lamina oblonga vel ovato-lanceolata, basi cuneata, apice obtusa vel acuta, 6–8 cm. longa, 2·5–3·5 cm. lata, utrinque glabra, coriacea, margine apicem versus irregulariter serrata, costa subtus prominente supra plana, nervis lateralibus utrinsecus 4–5 arcuatis domatiis in axillis nonnullis nervorum lateralium instructa. *Racemi* simplices, pauciflori, ad apices ramulorum inter folia juniora inclusis; pedunculi circiter 1·5 cm. longi; pedicelli 3–4 mm. longi, juniores adpresse sericeo-villosi, in statu fructifero crassi, ad 1 cm. longi. *Bracteae* lineari-lanceolatae, 4–5 mm. longae, pubescentes, caducae. *Flores* nutantes, cremeo-albidi. *Sepala* 5, libera, valvata, anguste deltoidea, circiter 5 mm. longa, basi 2 mm. lata, extra plus minusve leviter pubescentia, intus glabra, costa prominente. *Petala* 5, inflexa, crassa, oblonga vel apicem versus aliquanto latiora, 8–9 mm. longa, 2·5–3 mm. lata, quadrante superiore 3–5-lobata, extra sparse adpresseque sericeo-villosa, intus glabra, costa prominente. *Stamina* circiter 20; filamenta 0·5–1 mm. longa, sericeo-tomentosa; antherae lineares, 2–2·5 mm. longae, sparse velutinae, biloculares; valva altera breviter aristata, altera aristo recurvo subulato circiter 1·5 mm. longo instructa. *Discus* hypogynus, circiter 5-glandulosus, glandulis bifidis sericeis. *Ovarium* 3-loculare, conicum vel trigonum, in stylo sensim attenuatum, 2–3 mm. altum, 1·5–2 mm.

diametro, dense adpresse sericeo-villosum ; ovula per loculo 6–10 ; stylus subulatus, circiter 2 mm. longus ; stigma simplex. *Drupae* plus minusve anguste ovoideae, uniloculares, 2 cm. longae, 1–1·5 cm. diametro, suffuso-caeruleae, in statu sicco olivaceae ; putamen manifeste 6-costatum. *Semen* 1.

Lord Howe Island. North Hills at about 235 m., 27 Jan. 1937, *J. D. McComish* 106 (type) : tree, 6·5 m. high, not common, flowers creamy-white, with 5 petals deeply and irregularly incised, resembling somewhat those of *E. dentatus*. Summit of Mt. Gower, 946 m., Jan. 1937 *J. D. McComish* 106 A. Mt. Gower, July 1901, comm. *J. H. Maiden* (fruits only in Herb. Kew.).

This species of *Elaeocarpus*, the only one recorded from Lord Howe Island, was partially described by Maiden from very meagre fruiting material in Journ. Linn. Soc. N.S. Wales, **27**, 347 (1902). It is closely related to *E. dentatus* Vahl, a fairly common New Zealand plant, but appears to have no close affinities amongst Australian species. Capt. McComish reports that he has seen the tree in a third locality on the island, at about 1000 ft. on the slopes of Mount Lidgbird. A painting by Mrs. McComish kindly supplied by her to Kew shows the brilliant blue fruits of the species, the colour of which is not preserved in the dried specimens.

1323. **Cayratia eurynema** *B. L. Burtt* [Vitaceae] ; filamentis latioribus foliolis acuminatis ab affini *C. japonica* distinguenda.

Planta cirrifera scandens, caulibus brunneis, siccitate longitudinaliter rugosis sparse lenticellosis prope nodos sparse scabropubescentibus glabrescentibus, internodiis circiter 8 cm. longis. *Cirri* foliis oppositi, glabri, foliis multo longiores, aliquotiens furcati. *Stipulae* parvae, brunneae, membranaceae, mox caducae. *Folia* pedatim composita, 5-foliololata ; petiolus 3·5–5·5 cm. longus, supra leviter canaliculatus, primum pilis pluricellularibus sparse indutus, demum glabratus ; petiolulus medius 1·5–2·3 cm. longus ; laterales 7 mm. longi, in duos ramos 4 mm. longi furcati ; foliolum medium obovatum vel elliptico-obovatum, 5·5–7·5 cm. longum, 3–4 cm. latum, apice breviter acuminatum, basi cuneatum ; foliola lateralia late elliptica, superiora 7 cm. longa et 3·5 cm. lata, inferiora paullo minora 5·5 cm. longa 3 cm. lata leviter inaequilateralia. *Inflorescentia* paniculata, in ramo axillari ut videtur terminaliter edita, folio parvo suffulta : pedunculo eramoso 4–4·5 cm. longo. *Flores* in alabastro tantum visi ; pedicelli circiter 2 mm. longi dense pubescente. *Calyx* minutus, lobis obsoletis, ut pedicelli pubescens. *Petala* 4, oblonga, circiter 3·5 mm. longa et 1 mm. lata, apice incrassata, extra pubescentia. *Stamina* 4 ; filamenta medio dilatata, 0·75 mm. longa, 5 mm. lata ; antherae 1 mm. longae, 0·75 mm. latae, thecis basi leviter divergentibus. *Discus* ovario connatus et id leviter superans, obtuse cruciformis. *Ovarium* glabrum 4-loculare, ovulis in loculis solitariis basilaribus ; stylus 1 mm. longus, indivisus. *Fructus* (maturus ?) siccitate suborbicularis, 5 mm. longus et 5 mm latus, leviter compressus, monospermus, semine rugoso.

New South Wales. Comboyne, May, 1935 (in young fruit), *Dr. E. C. Chisholm* (comm. *Miss L. Fraser*: type). Dorrigo, 26 January 1936 (in bud) *Miss L. Fraser*.

Cayratia eurynema is clearly distinguished from the other members of the genus by its small inflorescences, broad filaments and more southerly distribution. To discuss its affinity with the other species is, however, by no means easy, as their limits are in many cases ill-defined. For instance, it is questionable if many of the Malayan specimens referred to *C. japonica* (Thunb.) Gagnep. really belong to that species at all. The true *C. japonica* differs from *C. eurynema* in its thinner leaves the crenations of which are rather rounded but conspicuously mucronate, as well as in its narrow filament. *C. clematidea* (F. Muell.) Domin, which also occurs in New South Wales, may be at once distinguished from *C. eurynema* by its more coarsely and acutely serrate leaves.

In Gagnepain's classification (see Lecomte, Notulae Systematicae, **1,** 339: 1911) *C. eurynema* would rank as a species with "geniculate peduncle" (actually the axis below the articulation can scarcely be called part of the peduncle in strict morphology), but this character is of doubtful importance as I have seen specimens with and without this articulation on the same sheet.

1324. **Erythrophloeum unijugum** *Airy-Shaw* [Leguminosae-Caesalpinioideae-Dimorphandreae]; *E. densifloro* (Elm.) Merr. affinis, foliis tantum 1-jugatis pinnis valde divaricatis petiolo 2–5 cm. longo, inflorescentiis magis elongatis ramosisque parcissime puberulis, calyce glabro, ovulis plerumque 5 distincta.—*Sympetalandra borneense* [sic !] Stapf sec. Merr. in Univ. Calif. Publ. Bot. **15,** 98 (1929), non Stapf.

Arbor 4·5 m. alta, trunco 15 cm. diametro (usque 30 cm. teste Elmer). *Ramuli* 3–6 mm. diametro, teretes, leviter striati, cortice cinereo subtiliter reticulato-fisso lenticellis parvis rotundatis sat numerosis notato, juniores tomento velutino ferrugineo subtilissimo vestiti. *Folia* abrupte bipinnata: petioli teretes, 2–5 cm. longi, vetustiores cinerei, glabri, juniores ferrugineo-tomentelli; pinnae 1-jugae, rhachi usque 11 cm. longa (petiolulo usque 3·5 cm. incluso), valde divaricatae, rectae, rhacheos internodiis 2–3 cm. longis; foliola 4-juga, ovato-oblonga usque ovato-elliptica, 6–10 cm. longa, 2–4 cm. lata, basi rotundata saepe obliqua, apice breviter acuminata acumine obtuso, glabra, modice coriacea, siccitate supra brunnescentia, nitidula, infra pallidiora, obscura; nervi laterales 5–8-jugi, patuli, inarcuati, intra marginem anastomosantes; petioluli foliolorum circiter 3 mm. longi, supra alte sulcati, siccitate nigri. *Inflorescentiae* late paniculatae (foliis racemos suffulcientibus suppressis), usque 30 cm. longae et latae; singuli racemi valde elongati, usque 18 cm. longi, saepe 2 seriatim ex eodem nodo orti, parcissime puberuli (juniores densius) vel glabrescentes, plus minus complanati, striati; bracteae minutissimae, triangulares, puberulae; pedicelli vix 1 mm. longi, patentes, glaberrimi, apice articulati;

bracteolae nullae. *Calyx* campanulatus, fere 2 mm. longus, rugulosus, glaber, breviter 5-lobus, lobis late triangularibus rotundatis. *Corollae* tubus breviter ovoideus, incrassatus, 1·5 mm. longus, apice constrictus, extra longitudinaliter 5-gibbosus ; segmenta oblonga, 3–4 mm. longa, 1·5–2 mm. lata, imbricata, apice rotundata, glabra, dorso leviter carinata, viridia. *Stamina* 10, perfecta, 2 cuique petalo opposita : filamenta filiformia, 7–10 mm. longa ; antherae ovoïdeo-oblongae, fere 1 mm. longae, applanatae, dorsaliter basifixae, versatiles, introrsae, apice decidue apiculatae. *Ovarium* ellipsoïdeum, 2–3 mm. longum, 1 mm. diametro, crispule pubescens, stipite glabro 2 mm. longo suffultum, in stylum glabrum 2–3 mm. longum attenuatum, stigmate punctiformi ; ovula 5, uniseriata. *Fructus* ignotus.

British North Borneo. Forested saline flats near Tawao, Oct. 1922–March 1923, *Elmer* 20923 : " A tree, trunk 30 cm. in diameter, the inflorescences yellowish green." Tawau, along the bank of the Marutai River, alt. 3 m., 14 April, 1932, *Agullana* in *For. Dept.* 1780 (typus, Herb. Kew.) : " Tree, 15 ft. high, 6 in. diam. ; flower green."

This is the first definite record of the genus *Erythrophloeum* for Borneo. Elmer's collection, erroneously identified by Merrill as *Sympetalandra borneënsis* Stapf, is in very young bud, but the characteristic bipinnate leaves with only one pair of pinnae are quite unlike the simply pinnate leaves of Stapf's plant, and its identity with the excellent flowering material recently received from the Forestry Department is beyond doubt. I have not seen the sterile specimen (*Villamil* 52) referred to by Merrill, l.c.

Merrill queries whether *Sympetalandra* be really generically distinct from *Erythrophloeum*. The discovery of *E. unijugum* suggests an answer in the negative. The only distinctions (few ovules and simply pinnate leaves in *Sympetalandra*) are quantitative only, and are approached by the four ovules and sometimes solitary seed of *E. densiflorum*, and by the reduction to one pair of pinnae in *E. unijugum*. I am unable to agree with Stapf (in Hook. Ic. Pl. **28,** t. 2721 : 1901) that *Sympetalandra* " can . . . . not be said to be closely allied to " any of the genera of the tribe *Dimorphandreae*. Even if no further links are discovered, it will at most constitute a section of *Erythrophloeum*.

1325. **Hoffmanseggia stipulata** *Sandwith* [Leguminosae-Caesalpinioideae-Eucaesalpineae] ; ab omnibus speciebus forma stipularum secus ramulos insigniter congestarum sese saepius imbricantium valde distincta ; praeterea ab *H. miranda* Sandwith locos similes habitante atque manifeste affini indumento eglanduloso foliolis magis coriaceis glaucis fere semper glabris legumine glabro differt.

Frutex nanus, ad 0·6 m. altus, radice subterranea lignosa fere 1·5 cm. diametro ; rami inferne lignosi, superne ramulos multos annotinos graciles flexuosos defoliatos brunneos glabros emittentes ; ramuli hornotini ut tota planta hornotina griseo-glauci, glabri ;

internodia permulta, brevia vel brevissima, saepe stipulis obtecta, 0·2–1 cm. longa. *Stipulae* pro genere egregiae, valde conspicuae, persistentes, secus ramulos permultae atque sese saepius imbricantes, ovatae, basi rotundatae atque ramulo late affixae, 5–8·5 mm. longae, 2·75–5 mm. latae, regulariter profunde lacerae, dentibus lanceolatis acutissimis porrectis superioribus terminalique saepe 2–3 mm. longis, e basi crasse subparallele nervosae, nervis ramulosis, coriaceae, glaucae vel senectute purpurascentes, glabrae vel dentibus sparse pilosis. *Folia* ascendentia, griseo-glauca, eglandulosa, petiolo rhachi pinnisque subtus plus minusve pilosis ceterum fere semper glabra ; petiolus 2–4·8 cm. longus ; pinnae imparipinnatae, 1–4-jugae, 1–2·5 cm. longae, internodiis rhacheos 2·5–10 mm. longis ; foliola 5–9-juga, suborbicularia usque obovato-oblonga, apice rotundata obtusa, basi rotundata brevissime cordata atque petiolulata, 2–6·5 mm. longa, 1·5–4·5 mm. lata, rigide coriacea, saepius plus minusve concava, glauca vel pruinosa, fere semper omnino glabra, rarissime parce ciliata, nervis supra omnino impressis subtus cum ramulis suis crasse prominentibus. *Inflorescentia* unica visa fere 8·5 cm. longa, fere glabra, parcissime pilosa ; pars florifera 3·5 cm. longa ; bracteae stipulis similes, pilosae, caducae ; pedicelli glabri, 2–3·5 mm. longi, ascendentes. *Flores* aurantiaci. *Calycis* tubus turbinatus, 2 mm. longus, apice excepto glaber ; lobi obovato-oblongi vel oblongi, rotundati obtusi, 5–5·5 mm. longi, 2·75–3·3 mm. lati, dorso copiose molliter albo-pilosi atque ciliati. *Petala* 4 subaequalia, lamina ovoideo-suborbiculari 6·5–7 mm. longa 5–5·75 mm. lata, ungue 3–4 mm. longo marginibus (laminaque inferne) basi excepta processibus filiformibus eglandulosis albis ad 2 mm. longis ornato ; petalum quintum lamina ovoidea 5·75 mm. longa 4·2 mm. lata, ungue 5·5 mm. longo supra canaliculato glabro. *Stamina* filamentis 9·5–10·3 mm. longis inferne dilatatis trientibus duobus inferioribus praecipue prope basin conspicue pilosis eglandulosis apicem versus glabris ; antherae oblongae, 1·4 mm. longae, 0·8 mm. latae. *Ovarium* brevissime stipitatum, glabrum, obovoideo-lineare, 3 mm. longum, 1 mm. latum ; stylus glaber, 9·5 mm. longus ; ovula 4. *Leguminis valvae* lineari-oblongae, fere 2·7 cm. longae, 7 mm. latae, glabrae, reticulato-venosae ; semina non visa.

Peru. Dept. Arequipa : Mejia, south of Mollendo, in sandy dips on open hillside, c. 90–180 m., 17 Sept. 1937, *D. Stafford* 899. " Dwarf shrub, 1–2 ft. high. Flowers orange."

This very interesting plant is clearly allied to *H. miranda* which inhabits the same region and has very narrow and inconspicuous fimbriate stipules with gland-tipped teeth, less rigid and scarcely glaucous more pubescent leaflets, densely glandular branchlets and inflorescence, and tomentose pods. The curious processes on the claws of the petals are similar in both species, but in *H. miranda* they are blackish in colour. Only a single flower of the present species has been available for dissection, so that modification of some of the measurements may be expected.

1326. **Dryandra** (**Eudryandra**) **Ashbyi** *B. L. Burtt* [Proteaceae-Banksieae] ; *D. Fraseri* R. Br. affinis, sed ramulis glabris, foliis brevioribus segmentis paucioribus longioribus, perianthii tubo glabrescente, fructu minus piloso distinguenda.—*D. Fraseri* R. Br. sec. Diels & Pritzel in Engl. Bot. Jahrb. **35**, 173, fig. 18 (1904)—non R. Br.

Frutex nanus ramulis brunneis glabris. *Folia* rigida, circiter 4–6 cm. longa, pinnatipartita, supra glabra subtus brevissime albo-tomentosa ; segmenta maxima circiter 1·5 cm. longa, pungentia, marginibus revolutis, basi decurrentia, ea folii apicem et basin versus minora ; costa et nervi segmentorum supra leviter impressa, subtus valde prominentia. *Capitula* lateralia vel terminalia, foliis circumcinctis, 2–3 cm. diametro. *Involucri bracteae* circiter 5-seriatae ; exteriores e basi ovato 2 mm. longo et 2 mm. lato apice in acumen setiforme 6 mm. longum productae, in interiores lineari-lanceolatas apice dense rubro-furfuraceas basin versus glabras sed basi ipso pilis paucis albis comosas 11 mm. longas et 1 mm. latas sensim transeuntes. *Squamae receptaculi* spatulatae, 2·5 mm. longae, basi pilis fere aequilongis circumcinctae, sub fructu ad 1·2 cm. elongatae. *Perianthium* 1·9 cm. longum, tube 1·4 cm. longo glabrescente, limbis anguste spatulatis extra sparse pilosis 5 mm. longis. *Squamae hypogynae* 4, 1·75 mm. longae, apice truncatae, emarginatae. *Antherae* in limbis perianthii subsessiles, 2 mm. longae. *Ovarium* 3 mm. longum, apice pilosum. *Stylus* 2·4 cm. longus, leviter curvatus, rigidus, stramineus, stigmate 3 mm. longo cylindrico leviter crassiore terminatus. *Fructus* 1·6 longus, 1 cm. latus, primum brunneo-pilosus, glabrescens. *Semina* nigra, 1·3 cm. longa et 1 cm. lata (ala inclusa).

W. Australia. Yuna, 30–40 miles N.E. of Geraldton; cultivated at Blackwood, S. Australia, *Ashby* 39 (type). Victoria near Geraldton, c. 20 m., 27 June 1901, *Diels* 3567 (Herb. Berol.) Victoria, near Minginew, c. 170 m., blue-green dwarf shrub, very thorny, *Diels* 3081 (Herb. Berol.).

Dryandra Ashbyi has been cultivated by Mr. Edwin Ashby in his garden at Blackwood, S. Australia. He obtained it at Yuna, near Geraldton in W. Australia and it has also been collected in the same district by Dr. L. Diels, whose specimens are in the Berlin Herbarium and have been kindly sent on loan to Kew.

Dryandra Ashbyi is most nearly allied to *D. Fraseri* R. Br., and was not distinguished from that species by Diels and Pritzel. *D. Fraseri* may be readily distinguished however by its densely pubescent branchlets, more pilose perianth tube and longer leaves, which have much shorter narrower more regular segments. These differences in the leaves give the two species a very dissimilar appearance. *D. Ashbyi* is a stiff rigid plant, but *D. Fraseri*, on account of its longer leaves, appears graceful by comparison. The perianth is rose-pink in *D. Fraseri* but greenish in *D. Ashbyi*.

Diels 3081 is not quite typical of *D. Ashbyi*, having more glaucous leaves with narrower segments. It is, however, very much closer to *D. Ashbyi* than to *D. Fraseri* or any other species so far described and for the present it is best referred to our new species.

It may be noted that in *D. Ashbyi* the leaves on the main shoots possess small prickly teeth at their bases, but these are absent from the leaves surrounding the capitulum.

1327. **Carex cranaocarpa** *Nelmes* [Cyperaceae]; affinis *C. hirtellae* Drejer, sed spicis crassioribus, utriculis majoribus in rostrum magis sensim desinentibus, rostro breviore praecipue differt.

Culmi alti, obtuse triquetri, laeves, graciles, inferne foliati. *Folia* culmorum 2–3 mm. lata, planiuscula, longe attenuata. *Spicae* 4–6; superiores 3 congestae, masculae, conicae, sessiles, terminalis longior; ceterae cylindricae vel ellipsoideo-cylindricae, 2–3 cm. longae, circiter 7–8 mm. latae, superiores 2 androgynaeceae, infima feminea, pedunculatae, pedunculis scabriusculis gracilibus. *Bracteae* inferiores foliaceae, culmo breviores, vaginantes, superiores squamiformes, vix vaginantes. *Squamae femineae* late ovato-ellipticae, breviter acuminatae, vitta mediana pallida excepta castaneae, marginibus late albo-hyalinae, tenuiter carinatae, carina scabriuscula vix excurrente. *Utriculi* squamas multo superantes et iis latiores, 7–8 mm. longi, elliptico-lanceolati, suberecti, membranacei, compresso-trigoni, inferne pallidi, superne castanei, adpresso-hispiduli, dorso tenuiter plurinerves, facie obsolete nerves, in stipitem brevissimum contracti, in rostrum breve albo-hyalinum oblique sectum obscure bidentatum sensim attenuati. *Nux* laxe inclusa, anguste oblonga, trigona, faciebus concavis, vix stipitata vel rostrata. *Stigmata* 3.

China. Chihli (Hopei): Tientsin, 9 August, 1929, *Licent* 9002.

1328. **Carex diplodon** *Nelmes* [Cyperaceae]; affinis *C. simulanti* C. B. Cl., sed culmis brevioribus, foliis latioribus, spicis femineis magis approximatis, utriculis parce hispidulis, rostris brevioribus differt.

Culmi 15–20 cm. alti, subvalidi, rigidi, laeves, basi excepta efoliati. *Folia* inflorescentia longiora, subcurvata, circiter 5 mm. lata, plana, marginibus scabriuscula, rigidiuscula, vaginis fuscis. *Spicae* 4–5, subapproximatae vel infima interdum remota, terminalis mascula, pallide castanea, gracilis, longipedunculata; laterales femineae, viridulae, subdensiflorae, cylindricae, erectae, plerumque 3 cm. longae, inferiores breviter exserte pedunculatae, pedunculis subvalidis. *Bracteae femineae* breviter foliaceae, spicis breviores, longivaginantes. *Squamae femineae* oblongo-lanceolatae, albidae, valde carinatae, carina scabriuscula in mucronem excurrente. *Utriculi* squamis sublongiores et latiores, 4·5–5 mm. longi, ellipsoideo-ventricosi, furfuracei, parce hispiduli, multinerves, brunneo-olivacei, basi oblique contracti et truncati, in rostrum sublongum validum conico-cylindricum saepe excurvum sublaeve ore grosse

bidentatum (dentibus interdum divergentibus) subsensim desinentes. *Nux* arcte inclusa, late ellipsoidea, trigona, vix stipitata, lateribus inferne concavis, in collum latum apice annulatum abrupte abeuntes. *Stigmata* 3.

China. Southeast Kansu: Koan-hia-ho, 16 April, 1919, *Licent* 5035.

1329. **Carex Licentii** *Nelmes* [Cyperaceae]; affinis *C. Karoi* Freyn, sed utriculis obovato-subglobosis brevissime rostratis praecipue differt.

Rhizoma dense caespitosum. *Culmi* 8–17 cm. alti, gracillimi, glabri, obtuse triquetri, basi excepta efoliati. *Folia* circiter 1 mm. lata, plerumque involuta vel conduplicata, inferne scabra, acuminata, apice duriuscula, culmis breviora vel eos subaequantia, vaginis inferioribus fuscis dissolutis. *Spicae* 3, superiores 2 subfastigiatae, infima remotiuscula; terminalis mascula, clavata, 5–6 mm. longa, straminea; ceterae femineae, 6–10 mm. longae, circiter 3 mm. latae, cylindricae, subdensiflorae, sublonge exserte pedunculatae, pedunculis capillaribus scabris. *Bracteae* femineae foliaceae, inflorescentiam subaequantes vel breviores, superne scabrae, apice duriusculae, longivaginantes; bractea mascula squamiformis. *Squamae femineae* albidae, tenuiter membranaceae, tenuiter carinatae, carina vix mucronulata. *Utriculi* plerumque squamis multo longiores et eis aequilati, vix 2 mm. longi, obovato-subglobosi, pallide albido-virides, glabri, enerves, dense puncticulati, basi breviter contracti, apice abrupte brevissime rostrati, rostro ciliolato bidentulo. *Stigmata* 3.

China. South Shansi: Ya t'eou, 6 June, 1916, *Licent* 2007.

1330. **Carex persica** *Nelmes* [Cyperaceae]; affinis *C. foliosae* D. Don, sed foliis angustioribus, bracteis brevissimis et squamiformibus, utriculis nervatis et laevirostratis differt.

Rhizoma caespitosum. *Culmi* circiter 30–40 cm. alti, stricti, subvalidi, striati, angulis apicem versus scabridis, inferne foliati, basi vaginis aphyllis brunneis vestiti. *Folia* inflorescentia multo breviora, 2–2·5 mm. lata, plana vel conduplicata, marginibus superne scabriuscula, longe acuminata. *Inflorescentia* 5–6 cm. longa, e spicis circiter 12 composita; spicae superiores approximatae et simplices, ovatae vel globosae, inferiores plus minusve interruptae et compositae, omnes androgynaeceae, parte mascula brevi et inconspicua, parte feminea pauciflora. *Bracteae* brevissimae et squamiformes. *Squamae femineae* ovato-acuminatae, mucronatae, pallide brunneae, viridi-carinatae. *Utriculi* squamas superantes, oblique patentes, ovati, plano-convexi, 3·5–4 mm. longi, olivacei, glabri, dorso ad basin et apicem plurinerves, ventre enerves, in basin spongiosam contracti, in rostrum mediocre et sublatum laeve ore bidentatum (dentibus strictis) sensim desinentes. *Nux* ovato-quadrata, erostrata, plano-biconvexa. *Stigmata* 2.

North Persia. Guilan, Lahijan, common in meadows, June, 1937, *Miss N. Lindsay* 945.

XXI—ON THE FLORA OF THE NEARER EAST: XX.*

R. A. Blakelock and W. B. Turrill

Three New Species and One New Variety.

R. A. Blakelock.

Isatis eriocarpa *Blakelock*, sp. nov. (§*Apterolobus*) ; ab *I. iberica* Stev. habitu perenne, foliis minus dentatis, siliculis dense albo-lanatis ; ab *I. Buschiana* Schischk. (e descr.) siliculis majoribus (c. 15 cm. longis nec 8 mm.) distinguitur.

Planta perennis vel biennis. *Caules* robusti, plus minusve erecti, 25–35 cm. alti, basin versus praecipue dense longe et patule pilosi (pilis usque 2 mm. longis). *Folia* integra vel parce dentata, utrinque sub-dense patule pilosa ; radicalia oblonga vel oblongo-ovata, 3–7 cm. longa, 0·6–1 cm. lata, in petiolum attenuata ; caulina oblonga vel lineari-oblonga, basi valde auriculata, 2–7 cm. longa, 0·3–1 cm. lata. *Pedicelli* glabri vel sparse pilosi, c. 7 mm. longi, floriferi filiformes, fructiferi apice sensim valde incrassati. *Sepala* glabra, luteo-virescentia, oblonga, 3 mm. longa, 1 mm. lata. *Petala* alba vel ochroleuca (?), 4·5 mm. longa, 2 mm. lata (ungue c. 2 mm. longo) ; lamina obovata. *Antherae* 1 mm. longae. *Filamenta* 2–2·5 mm. longa. *Ovarium* minute pubescens, 2 mm. longum, 1·5 mm. latum. *Silicula* linguiformis, cuneata, dense longeque albolanata, 15 mm. longa ; ala terminalis 6 mm. longa, 5 mm. lata, apice truncata, retusa ; loculus c. 4 mm. latus. *Semina* oblongo-elliptica.

Asia Minor : Marash, Akker Dagh, c. 1000 m., 30.4.34, *E. K. Balls and W. B. Gourlay* 912.

This species of *Isatis* is unusual in having densely lanate siliculae, which give it a marked superficial resemblance to *I. Aucheri* Boiss. var. *vellifera* (Boiss. et Noë) Boiss. The fruit-shape, however, places it in the section *Apterolobus* Boiss. In the general robustness of its growth, *I. eriocarpa* resembles *I. iberica* Stev., from which it differs in the densely lanate siliculae, the denser tomentum on all parts, and the less dentate leaves. The scars of dead radical leaves and a thick much-branched root show it to be perennial or biennial, although the other known species of the section *Apterolobus* are annuals, except *I. pyramidata* Stapf, in Denkschr. Mat-Nat. Akad. Wien. 19 (1886), which is described as "biennis (?)". Our specimen also possesses a few flowers larger than all the rest, but these are clearly abnormal and hypertrophied.

Isatis Guestii *Blakelock* sp. nov. (§*Apterolobus*) ; ab *I. iberica* Stev., habitu perenne vel bienne, siliculis dense albo-lanatis differt ; ab *I. eriocarpa* Blakelock foliis majoribus valde dentatis minus pilosis, fructus forma recedit.

Planta perennis vel biennis. *Caules* robusti, erecti, c. 60 cm. alti, basin versus patule pilosi, superne glabrescentes vel glabri.

* Continued from K.B. 1938, 468.

Folia valde dentata vel interdum subpinnatifida, utrinque patule pilosa vel glabrescentia ; radicalia oblonga, dentata vel subpinnatifida, c. 6–15 cm. longa, 1·3–5 cm. lata ; caulina oblonga vel lineari-oblonga, basi valde auriculata, dentata, usque c. 12 cm. longa, c. 3 cm. lata. *Pedicelli* glabri (raro sparse pilosi), 7–12 mm. longi ; floriferi filiformes ; fructiferi apice sensim valde incrassati. *Sepala* glabra, luteo-virescentia, oblonga, 2–2·5 mm. longa, 1–1·5 mm. lata. *Petala* alba vel ochroleuca (?), 4 mm. longa, 1·5–2 mm. lata (ungue c. 1 mm. longo) ; lamina oblongo-obovata. *Antherae* 1 mm. longae. *Filamenta* 1–2 mm. longa. *Ovarium* pubescens. *Silicula* immatura linguiformis, biconstricta, dense albo-lanata, 13 cm. longa, inferne incrassata et c. 2 mm. lata ; ala terminalis 7 mm. longa, 3 mm. lata, apice minus dense lanata, basi cuneata, apice obtusa ; loculus c. 2 mm. latus, basi angustatus. *Semina* oblongo-elliptica.

N. Iraq : Dohuk Gorge, 500 m., on a rocky cliff, 21.4.32, *E. R. Guest* 2171 (type).

Asia Minor : Cilicia [no precise loc.], 1895, *W. Siehe* 488.

Isatis Guestii differs from *I. eriocarpa* in the larger more dentate leaves, and the less dense tomentum. On comparing fruits of the same age in the two species, it is seen that the silicules of *I. Guestii* are constricted above and below the loculus and have the apex obtuse (as in *I. iberica* Stev.), while in *I. eriocarpa* the silicules are unconstricted and have the apex truncate and retuse (as in *I. minima* Bge.). In Siehe's specimen (No. 488) the fruits are too young to show this character.

Isatis glabrisiliqua *Blakelock*, sp. nov. (§ *Apterolobus*) ; ab *I. stenocarpa* et *I. pyramidata* Stapf (e descr.) siliculis glabris ; ab *I. iberica* Stev. siliculis glabris, bracteis et foliis caulinis superioribus majoribus ; et ab *I. minima* Bge. bracteis et foliis majoribus et siliculis glabris apice obtusis differt.

Radix ignota. *Caules* ramosi, supra 40 cm. alti, glabri. *Folia* radicalia ignota ; caulina superiora integra vel remote dentata, glabra, costa in pagina inferiore parce patule pilosa excepta, oblonga vel lineari-oblonga, basi valde auriculata, usque 9 cm. longa, 3 cm. lata, in bracteas transeuntia. *Bracteae summae* foliis similes sed minores, 2·5–4·5 cm. longae (nec 1–2 cm. longae ut in *I. iberica*). *Pedicelli* glabri, 10–15 mm. longi, floriferi filiformes, fructiferi apice sensim valde incrassati. *Sepala* glabra, luteo-virescentia, oblonga, 2·5 mm. longa, 1 mm. lata. *Petala* ochroleuca vel alba (?), 3·5–4·5 mm. longa, 1·5 mm. lata (ungue 1–2 mm. longo) ; lamina oblongo-obovata. *Antherae* 1 mm. longae. *Filamenta* 1–2·5 mm. longa. *Ovarium* glabrum. *Silicula* immatura linguiformis, biconstricta, glabra, c. 15 mm. longa, inferne incrassata ; ala terminalis 8 mm. longa, 3 mm. lata, basi cuneata, apice obtusa ; loculus c. 2 mm. latus, basi parce angustatus. *Semina* oblongo-elliptica.

N. Iraq : Rowanduz Gorge, 500 m. on ledges on rocky cliffs on the gorge sides, large bushy plant, 20.4.32, *E. R. Guest* 2144.

This plant is distinguished from all the other species of the section *Apterolobus* by the glabrous fruits. The large bracts give the inflorescence a more leafy appearance than in the material of *I. iberica* Stev. in Herb. Kew., but I am doubtful of the value of this character.

Silene odontopetala *Fenzl.* var. **glabrifolia** *Blakelock*, var. nov. ; a typo differt habitu nano, caule subscapiforme, foliis glabris.

Planta caespitosa ; *caules* subscapiformes, 2–12 cm. alti, basin versus glabri, 1–3-flori. *Folia* radicalia lineari-lanceolata, glabra, glaucescentia, majora in petiolum attenuata, laminis 5–18 mm. longis, 1·5–3 mm. latis ; folia caulina linearia, glabra, glaucescentia, sessilia, usque ad 14 mm. longa, 2 mm. lata. *Inflorescentia* glanduloso-pubescens. *Calyx* glanduloso-pubescens, ruber vel rubro-venosus.

N. Iraq : Chia-i-Mandali, 2500 m., on a cliff, 19.7.32, *E. R. Guest* 2803 ; Arl Gird Dagh, 3100 m., on the rocky mountain side, fls. white-yellow, 22.7.32, *E. R. Guest* 2859 (type) ; do., pinkish fls., *E. R. Guest* 2860.

This variety of the polymorphic *S. odontopetala* is distinguished by having glabrous leaves. Var. *physocalyx* (Ledeb.) Rohrt. (var. *latifolia* Boiss.) was originally described as " pubescens " (Ledebour, Fl. Ross. **1,** 321), although in some specimens included by Boissier (Kotschy 295 in Fl. Or. **1,** 626) the leaves are glabrous. The wider leaves of var. *physocalyx* separate it from our plant. The flower colour appears to vary from white to yellow to pinkish.

Two New Species and New or Important Records.

W. B. Turrill.

Saponaria glutinosa *M. Bieb.* Flor. Taur, **1,** 322 (1808).

The following specimens from Albania extend the known range of this species : Grown in the Herbarium Ground, Kew, 1938, as K.1713, from seeds collected in Albania : Dardhë, near Korçë, c. 1400 m., 25.8.1935, *Alston and Sandwith*, in flower at Kew 9.6.38 and 23.6.38, in fruit 8.8.38 ; Albania : Dardha beechwood, 15.8.38, *Ian Hepburn* 167 ; Thrace : Xanthie-Shahin Rd., c. 100 m., 11.6.1930, rocky hill slope *H. G. Tedd* 413.

The species was originally described from " in Tauriae montosis, ad sylvarum margines locisque sterilibus. Circa pagum Temirdschi frequens." Simmler [Monogr. Gatt. Saponaria, in Denkschr. Math.-Naturwiss. Kl. K. Akad. Wiss. Wien, **85,** 467 (35) : 1910] places the species in the section *Kabylia*, § *Glutinosae*, and records it from : Morocco, Algeria, Spain, France, Hungary, Crete, Greece, Thessaly, South Macedonia, South Bulgaria, Serbia, Dalmatia, Crimea, Caucasus, Asia Minor, and Syria. To these have to be added records from North Macedonia, North Bulgaria, the Rodope Massif, and Roumania.

This species is very striking. On all its vegetative parts and on the calyces it bears a dense strongly glandular indumentum yielding an abundant very sticky excretion. This catches and holds

fast numerous insects, including honey bees and bumble bees. Since the flowers emit a strong and sickly sweet odour large numbers of insects visit the plant, which is soon covered with the dead bodies of its victims. It acts as a very efficient " fly-paper " and in good journalese might be termed " the stickiest plant in the world." How it is pollinated is still a mystery. At Kew it has behaved as a biennial.

Anthyllis aegaea *Turrill*, sp. nov., a *A. Barba-jovis* L. foliolis angustioribus, floribus majoribus, legumine majore recedit.

Frutex ramosissimus, dense foliosus, usque ad 6 dm. altus, ramis lignosis cinereis, novellis dense argenteo-sericeis. *Folia* 1·5–3·5 cm. longa, 7–14-juga, fere sessilia, foliolis linearibus apice subacutis basem versus leviter angustatis 0·6–1·5 cm. longis 1–2 mm. latis in pagina superiore glabris vel leviter pilosis in pagina inferiore dense adpresseque argenteo-sericeis ; rhachis dense argenteo-sericea interdum subpersistens, basi latissima, amplexicaulis ; bracteae (vel folia suprema) breviter pinnatae vel 3–7-digitatae, capitula multo breviori-bus. *Capitula* terminalia, 5–15-flora, sphaeroidea, 2–3 cm. diam. ; pedicelli 2–3 mm. longi. *Calyx* breviter subcylindricus, abaxialiter leviter ventricosus, dense adpresseque argenteo-sericeus ; tubus 5–6 mm. longus, 2·5–3 mm. diam. ; dentes anguste lineares, leviter inaequales, dente abaxiale 2·5–3 mm. longo, dentibus adaxialibus lateralibusque 1·5–2 mm. longis. *Vexilli* lamina oblongo-obovata apice rotundata 6 mm. longa 5 mm. lata, ungue tenue 6 mm. longo ; alae 11 mm. longae, lamina anguste oblonga 5 mm. longa 1 mm. lata ; carina 10 mm. longa, ungue tenuissimo 6 mm. longo. *Stamina* monadelpha, 9·5 mm. longa, partibus liberis circiter 1·5 mm. longis apicem versus dilatatis deinde abrupte angustatis, antherae post dehiscentiam 0·5 mm. longae. *Ovarium* multiovulatum. *Legumen* immaturum leviter lateraliter compressum, 11 mm. longum (stylo persistente gracile circiter 4 mm. longo incluso), monospermum.

Cyclades : Pholégandros, cliffs, 6.6.1938, *P. Davis* 224 (typus in Herb. Kew.).

Amongst the interesting specimens collected by Mr. Peter Davis from the Aegean area is a fine shrubby species of *Anthyllis* which in many ways resembles *A. Barba-jovis* L., but appears to be sufficiently distinct to justify describing as a new species. *A. Barba-jovis* L. (Sp. Pl. 720 : 1753, " Habitat in Helvetia ") is known from a wide area in the western Mediterranean Basin, in the south of Europe and in North Africa. In the Balkan Peninsula it is known definitely only from Dalmatia, where it is a not uncommon constituent of the open vegetation of rocky places within range of the coast. The record of M. L. Rodriguez from Albania : Mali Thate 1900 m. (in Bull. Mus. Nat. Hist. Nat. 1923, 618) is very doubtful. Willdenow (Sp. Pl. **3,** 1018 : 1803) described a species under the name *A. splendens*, giving the " habitat " as " in Creta." This was reduced by Boissier (Flor. Or. **2,** 157 : 1872) to a variety of *A. Barba-jovis*, as var. *pauciflora*. The flowers

are said to number 5 to 10 in a capitulum, the subtending bracts to be longer than the capitula, and the calyces to be ovate. It remains a doubtful plant, which has not since been recorded from Crete.

A. aegaea has probably to be classified near *A. Barba-jovis* on the sum of its characters. The narrower leaflets are on the whole rather more numerous, the larger flowers are less densely arranged and project more from the capitula, and the immature legumes are larger than those of *A. Barba-jovis*. Grisebach (Spic. Flor. Rumel **1,** 13–15 : 1843) divides the species of the genus dealt with by him into three sections. Boissier (l.c.) accepts these sections (though retaining a name of De Candolle's for one of them) and places *A. Barba-jovis* in Grisebach's section *Oreanthyllis* together with *A. aurea* Vis. and *A. montana* L. Grisebach himself did not (in loc. cit.) deal with *A. Barba-jovis*, and the only species he records for his section *Oreanthyllis* is *A. montana*. Boissier's classification is not entirely satisfactory and it may eventually be desirable to make a new section for *A. Barba-jovis* and *A. aegaea*. Unfortunately all the material of the latter at present available is past full anthesis, the ovaries having been fertilized and being in the condition of young fruits. It is thus impossible, in this species, to check Boissier's character of " ovarium . . . sessile." Grisebach actually says " legumen sessile," and *A. aegaea* has the immature legumes with a short but distinct stalk 1 mm. long, formed by the very abrupt narrowing of the legume proper. In *A. Barba-jovis* a very considerable change in shape occurs in the gynoecium between anthesis and the full ripening of the fruit. There may well be a corresponding change in *A. aegaea*, but this can only be determined when flowering material becomes available.

Galatella cretica *Gandoger* in Flor. Cret. 59 (1916) et Bull. Soc. Bot. Fr. **63,** 235 (1916).

Hayek, Prod. flor. penins. balc. **2,** 584, footnote (1931), under *Aster*, says " Galatella cretica *Gandgr.* Fl. Cret. 59 incomplete nota est et dubium videtur, num ad hoc genus pertineat." It is, therefore, of particular interest to record two sheets of this species recently received at Kew : Creta or. : in rupestribus siccis ad radices montis Aphendi Kavatsi (Hierapetra), alt. 150 m., 13.9.38, *H. D. Ripley et R. C. Barneby* 1942 ; in fissuris rupium calcar. pr. Margasà (Siteia), 17.9.38, *H. D. Ripley et R. C. Barneby* 1988. The second sheet has capitula in full flower and at various early stages of development. The species is quite distinct from *Galatella cana* Nees (*Aster canus* W. et K.).

Acantholimon Echinus (*L.*) *Boiss.* This species has been recorded in the Balkan Peninsula (and islands), from Crete (including from here the var. *creticum* Boiss.), Greece (including Cephalonia), and Epirus. It has a wide distribution in Asia Minor, eastwards to Armenia and possibly the Caucasus and " Kurdistan." Specimens

have now been received from southern Albania, an extension of its known northern distribution in Europe.

ALBANIA: district of Gjinokastrë (Argirokastron), Mali Lunxheriës range, c. 1540 m., occasionally down to 1400 m., on limestone slopes, plentiful on Strakaveci, 11–12.7.33, *Alston and Sandwith* 2182; serpentine rocks between Dardha and Korçë, 17.8.38, *Ian Hepburn* 140.

The distribution of the variations of the species as a whole is interesting. In Europe there is a suggestion of a rather irregular cline. Available Cretan material is entirely dwarf, very compact, with low few-flowered inflorescences, and the leaves glabrous or puberulous. Material from Taygetos shows a mixture of plants, some of which are taxonomically indistinguishable from some Cretan plants, while others link on to the taller, less compact, on the average slightly more- and larger-flowered plants of northern Greece and Albania. Boissier, Diagnoses I, **7**, 73 (1846), divided the species into four varieties, placing all the Cretan material known to him in the var. *creticum* Boiss, and all the Greek (and much of the Asia Minor) material in var. *majus* Boiss. Actually this represents a much sharper distinction and a higher degree of correlation of characters than, as we now know, occurs.

The occurrence and distribution of indumentum and of plants with and without indumentum in this species is also worth notice. There is considerable variation in the degree of development of hairs (quantity and length) and in their distribution on inflorescence axis, bracts, and foliage leaves. Puberulous and glabrous or almost glabrous plants occur in Crete and may be found in one collecting (e.g. *F. Lemperg* 591, Hag. Preuma). On the Greek mainland the plants have quite or almost glabrous leaves (except for marginal ciliations). In Asia Minor, also, there is a mixture of variations in indumentum characters, for example, in collections from Tmolus (*Boissier*) and Taurus (*Kotschy*).

Gentiana ciliata *L.* This well known Central European species has been previously recorded from Macedonia, North Bulgaria, Rodope Massif, Serbia, Montenegro, Bosnia, Hercegovina, Dalmatia, South Croatia, and Istria, in the Balkan Peninsula. A specimen has now been received at Kew collected in ALBANIA: serpentine rocks between Dardha and Korçë 17.8.1938, *Ian Hepburn* 146.

Cerinthe retorta *S. et S.* and **C. purpurea** *Vis.*

C. retorta was described (Sibth. et Sm. Prodr. **1**, 120: 1806 et Flor. Graec. **2**, 60, t.171: 1813) from material stated to have been collected in the Peloponnese and in Caria. The corolla is described as having a yellow tube and a violet limb. The figure in the Flora Graeca shows the tube very pale yellow in the lower part, deeper yellow above the middle and then deep violet, the five expanded lobes being (on the upper surface) paler violet. So far as can be judged from dried material this is the flower colour for all specimens

seen from Crete and Greece (south of Thessaly). Sibthorp (l.c.) records the species from Caria. The occurrence in Asia Minor has not been definitely substantiated. Specimens have also not been seen from South or North Macedonia.

Visiani (in Flora **12,** Ergb. **1,** 8 : 1829) described *Cerinthe purpurea* from " in sylvaticis Boraja inter Sibericum et Tragurium," in Dalmatia. In his Flora Dalmatica **2,** 242 (1847) he reduces *C. purpurea* to *C. retorta* S. et S. but very accurately describes the corolla (from Dalmatian material) as follows : " Corollae tubus basi angustus albidus, dein sensim crassior violaceus, faucem versus zona ochroleuca acute flexuosa cinctus et deorsum gibbosus, apice subincurvus, limbo violaceo constricto, dentibus brevissimis triangularibus obtusis reflexis pallidis." This description agrees with type material at Kew. The following specimens from Albania also agree with the Dalmatian material : Sarandë (Santi Quaranta), near sea-level, rocky limestone slope, 30.5.1933, *Alston and Sandwith* 1228 ; Ajyrocaster, 250 m., limestone, rocky ground, 21.4.36, *R. V. Pennington* 156. Alston and Sandwith describe the colours as : leaves white-spotted ; bracts blue-violet ; corolla blue-violet, but with a narrow yellow band towards the apex. One specimen from Thessaly, Guvelzi, ad rupes, 6.6.1896, *Sintensis* 507, has, so far as can be ascertained from the dried material, the corolla tube blue-violet with a yellow band below the apex and a ring or blotches of blue-violet above this. A sheet from the Troas, Thymbra : in rupibus ad ripas Scamandri, 4.5.1883, *Sintenis* 118, has been named *C. rotorta* by *P.* Ascherson. The material at Kew of this number has larger and more condensed inflorescences than is usual in the species and the determination remains doubtful. So far as can be seen the corollas have blue-violet tubes with an incomplete yellowish band near the apex.

Authors subsequent to Visiani (e.g. DC. Prodr. **10,** 4 : 1846 ; Halácsy, Conspec. Flor. Graec. **2,** 318 : 1902 ; Hayek, Prod. flor. penins. balcan. **2,** 92 : 1928) accept the reduction of *C. purpurea* to *C. retorta* with little or no comment and do not even make varieties. No other differences that can be considered other than slight fluctuations can be found between any of the specimens from Thessaly, Albania, and Dalmatia mentioned above and those from Crete and Greece, except that the very unequal sepals may be on the whole shorter and relatively broader at the same stage in the more southern plants. It appears, therefore, that there may here be an interesting single character difference (corolla colour) which has a clear-cut geographical distribution, and is associated with few or no other differences. The mainly yellow tube to the south of a line to be drawn somewhere across northern (Old) Greece and the mainly blue-violet tube to the north of this line. It is much to be desired that further collecting of *Cerinthe* be done, especially to the immediate north and north-west of Attica, to determine if the change from *C. retorta* to *C. purpurea* be abrupt or whether there be a cline which

might perhaps be of the nature of a "taxonomic ecotone." Additional material to allow of a comparison of fair samples for details of flower structure (involving dissection of material) and ripe fruits is also needed.

Odontites glutinosa (*M. Bieb.*) *Benth.* This species has a general distribution from the central parts of the Balkan Peninsula, eastwards to the Caucasus. In the Balkan Peninsula it is recorded from Greece (Taygetos), North Macedonia, North Bulgaria, Rodope Massif, Serbia, and Montenegro. It has recently been collected in southern Albania and the following specimens from Albania are at Kew: District of Korçë: mountains above Dardhë, 1700–1800 m., locally abundant on bare sandy ground, 25.8.1935 *Alston and Sandwith* 2674. Flowers pale yellow; back of upper lip brownish purple; throat with a few purplish spots. Dardhë (Dardha), 1850 m., limestone rocks, 15.8.1938, *Ian Hepburn* 126.

Colchicum creticum *Turrill*, sp. nov.; a *C. Cupani* Guss. tuberis tunicis membranaceis castaneis superne haud elongatis distinguitur.

Cormus irregulariter ovoideus, 3–3·5 cm. altus, 2 cm. diametro, tunicis membranaceis in collum haud productis castaneis venis longitudinalibus numerosis conspicuis instructis. *Cataphyllum* vaginatum, tubulosum, superne pallide viride, inferne luteo-album, 4 cm. longum. *Folia* synanthia, 2–3, anguste lanceolato-linearia vel linearia, acuta, 6–9 cm. longa, usque ad 9 mm. lata, glabra, plus minusve canaliculata, multinervia. *Flores* 1–3, autumnales, parvi, pallide purpureo-rosei; perianthii tubus anguste cylindricus, usque ad 7 cm. longus, 2·5 mm. diametro; limbi segmenta linearioblanceolata, apice subacuta vel obtusa interdum leviter cucullata, 1·9 cm. longa, 4 mm. lata, staminis circiter duplo longiora, quinquenervia. *Stamina* 9 mm. longa, filamentis subulatis basem versus incrassatis inferne luteis apicem versus purpureis, antheris versatilibus post dehiscentiam 2 mm. longis atropurpureis. *Carpella* usque ad medium libera, anguste cylindrica, 5 mm. longa; styli 6 mm. longi, apice punctiformes.

CRETE: Omalo Plain, coll. *P. Davis*, 1938, and grown at St. Vincent, East Grinstead, Sussex.

The only species of *Colchicum* recorded from Crete and maintained as species by recent authorities are *C. latifolium* S. et S. and *C. pusillum* Sieb. The former is so very different from *C. creticum* that it is superfluous to discuss it comparatively. *C. pusillum*, however, is nearer, but differs in having the outer "tunics" of the corms elongated at the apex above the corms proper. It also has 3–4 leaves and is most often said to have yellow anthers. Stefanoff, Monogr. Colchicum 55 (1926) says, however, for *C. pusillum*, "antheris . . . flavis vel fuscis." The average number of leaves for *C. creticum* is uncertain, but is probably two or three.

XXII—CONTRIBUTIONS TO THE FLORA OF TROPICAL AMERICA: XLI.*

Plantae Hintonianae: XI.*

The Genus Dalea Juss.: New Combinations and Notes.

A. A. Bullock.

The generic name *Dalea* Juss. (1789) is a later homonym of *Dalea* Mill. (1754), but has now been placed on the list of *nomina conservanda*. But for its conservation the correct name for the genus would be *Parosela* Cav. (1802), which was adopted by Rose and by Rydberg, who have described most of the species discovered during the last forty years. These consequently require new binary names under *Dalea* Juss.

In the following list some of them are supplied, in order that the material of this genus collected in Mexico by Mr. G. B. Hinton may be named in accordance with the International Rules. Some new records, based on Mr. Hinton's collections, are also included, together with some necessary new binomials not directly concerned with his plants.

Dalea abietifolia (*Rose ex Rydb.*) *Bullock* comb. nov.—*Parosela abietifolia* Rose ex Rydb. in N. Amer. Fl. **24,** 92 (1920); Standl. in Contrib. U.S. Nat. Herb. **23,** 462 (1922).

A very distinct species, known only from Etzatlán, Jalisco, where it has been collected twice (*Pringle* 8774 and *Barnes and Land* 295).

Dalea acutifolia *DC.* in DC. Prodr. **2,** 245 (1825).—*Parosela acutifolia* (DC.) Rose in Bot. Gaz. **40,** 144 (1905); Rydb. *l.c.* 86; Standl. *l.c.* 460.

State of Mexico. District of Temascaltepec: Bejucos, 610 m., Oct. 1932 (fl.), *Hinton* 2001; Chorrera, 1230 m., Nov. 1932 (fl.) *Hinton* 2636, " 1 stalk 3 m. high "; Palmar, 650 m., on the llano, Nov. 1933 (fl., fr.), *Hinton* 5184, " shrub 1·5 m. [high] "; Tejupilco, 1400 m., Dec. 1933 (fr.), *Hinton* 5292, " 1 m. high."

State of Michoacan. Mal Paso–Chumbitaro, District of Huetamo, on a hill, Nov. 1934 (fl., fr.), *Hinton* 6968, " stalks 1·5 m."

Previously known only from Morelos and Guerrero.

Dalea alamosana (*Rose ex Rydb.*) *Bullock*, comb. nov.—*Parosela alamosana* Rose ex Rydb. *l.c.* 63 (1919).

Represented at Kew by a sheet of the type collection (*Palmer* 711 of 1890) from Alamos, State of Sonora. It has the general appearance of *D. calycosa* A. Gray, but differs strikingly in its smaller, unequally toothed calyx.

Dalea Barberi (*Rose ex Rydb.*) *Bullock*, comb. nov.—*Parosela Barberi* Rose ex Rydb. *l.c.* 74 (1920).

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* Continued from K.B. 1939, 95.

Represented at Kew by a sheet of the type collection (*Townsend and Barber* 275) from the Sierra Madre near Colonia Garcia, Chihuahua.

Dalea Brandegei (*Rose*) *Bullock*, comb. nov.—*D. ramosissima* Benth. Bot. Voy. Sulph. 11 (1844), non Martens et Gal. (1843).—*Parosela ramosissima* (Benth.) A. Heller, Cat. N. Amer. Pl. ed. II. 6 (1900).—*P. Brandegei* Rose in Contrib. U.S. Nat. Herb. **10,** 106 (1906) ; Rydb. *l.c.* 107 ; Standl. *l.c.* 458.

The original material of this species consists of four sheets from Magdalena Bay, Baja California (*Hinds* in herb. Benth., *Hinds* in herb. Hook., and *Hinds and Barclay* in herb. Hook., the first consisting of two sheets) ; these were collected about 1841, and only one other specimen has reached Kew since then. This is *Mason* 1896, collected at the same locality in May, 1925.

Dalea carnescens (*Rydb.*) *Bullock*, comb. nov.—*Dalea rubescens* S. Wats. in Proc. Amer. Acad. **20,** 360 (1885), non S. Wats. (1882).—*Parosela rubescens* A. Nels. in Coult. et Nels. Man. 298 (1909), non Vail (1894).—*P. carnescens* Rydb. Fl. Rocky Mts. 483 (1917), et in N. Amer. Fl. **24**, 99 (1920).

Rydberg selected a Chihuahua specimen (*Pringle* 196) as the type of this species, but it is known also from southern Colorado to Arizona, and from Coahuila.

Dalea caudata (*Rydb.*) *Bullock*, comb. nov.—*Parosela caudata* Rydb. in N. Amer. Fl. **24,** 112 (1920) ; Standl. *l.c.* 456.

This species was, until recently, unrepresented at Kew. It is apparently confined to the State of San Luis Potosi, and the Kew sheet is from Charcas, where it was collected in 1934 by Dr. C. L. Lundell ; it was identified by Dr. P. C. Standley.

Dalea citrina (*Rydb.*) *Bullock*, comb. nov.—*Parosela citrina* Rydb. *l.c.* 81.

State of Mexico. Ixtapan, District of Temascaltepec, 1000 m., on a hill, Oct. 1932 (fl.) *Hinton* 2257.

State of Michoacan. Tacupa, District of Huetamo, " in ripa fluminis Balsas " April 1935 (fr.), *Hinton* 7580.

State of Guerrero. District of Mina : Placeres, 340 m., on the llano, Sept. 1936 (fl., fr.), *Hinton* 9530, " up to 1 m. high, flower blue " ; Manchon, on the llano, Sept. 1936 (fl.) *Hinton* 9586, " 1 m. [high], flower blue."

This is also represented at Kew by a sheet of the type collection (*Pringle* 8860), from near Tuxpan, Jalisco.

Dalea delicata (*Rose*) *Greenm.* in Publ. Field Mus. Nat. Hist. Chicago, Bot. Ser. **2,** 331 (1912).—*Marina gracilis* Liebm. in Vidensk. Meddel. 1853, 103 (1854), nec *Dalea gracilis* Kunth, Mimoses, 166, t. 48 (1824), nec *Parosela gracilis* (Kunth) Rose in Contrib. U.S. Nat. Herb. **10**, 105 (1906).—*Parosela delicata* Rose in Contrib. U.S. Nat. Herb. **8,** 304 (1905) ; Rydb. *l.c.* 51 (1919).

State of Mexico. District of Temascaltepec: Calera, 770 m., Aug. 1932 (fl.), *Hinton* 1462; Plaza de Gallos, about 950 m., on a hill, Sept. 1932 (fl.), *Hinton* 1750; Bejucos, 610 m., parasitized by *Cuscuta* sp. (*Hinton* 4776 B), Sept. 1933 (fl.) *Hinton* 4776 A, "flower blue."

State of Guerrero. Coyuca–Chacamerito, District of Coyuca, Sept. 1934 (fl., fr.), *Hinton* 6665. Parotas–Filo, District of Mina, on the llano, Aug. 1936 (fl.), *Hinton* 9409. Iguala (near), 780 m., on dry hills, Sept. 1900 (fl.), *Pringle* 8442.

This is now a very well known species; it is included here merely to draw attention to the preoccupation of its earliest effectively published specific epithet.

Dalea elongata (*Rose*) *Bullock*, comb. nov.—*Parosela elongata* Rose in Contrib. U.S. Nat. Herb. **8,** 306 (1905); Rydb. *l.c.* 60.

State of Guerrero. Coyuca–Tinajas, District of Coyuca, "in ripa fluminis Balsas"; March 1934 (fl.), *Hinton* 5846.

This is a comparatively poor specimen, but it seems to belong to *D. elongata* which was previously unrepresented at Kew.

Dalea gigantea (*Rose ex Rydb.*) *Bullock*, comb. nov.—*Parosela gigantea* Rose ex Rydb. *l.c.* 110 (1920); Standl. *l.c.* 457.

State of Mexico. District of Temascaltepec: Comunidad, 2510 m., in forest of mixed *Pinus* and *Quercus*, July 1932 (fl.), *Hinton* 975, "shrub 2·5 m. high"; Carboneras, 2030 m., on a hill, Sept. 1932 (fl.), *Hinton* 1846.

This is also represented at Kew by a sheet of the type collection (*Pringle* 8848), from Tarascon, Michoacan.

Dalea glabrescens (*Rydb.*) *Bullock*, comb. nov.—*Parosela glabrescens* Rydb. *l.c.* 106; Standl. *l.c.* 458.

Known only from San Luis Potosi. It is represented at Kew by a sheet of the type collection, *Parry and Palmer* 150, and a small part of the same collectors' number 149.

Dalea Hemsleyana (*Rose*) *Bullock*, comb. nov.—*D. ramosissima* Hemsl. Biol. Centr.-Amer. Bot. **1,** 245 (1880), nec Martens et Gal. (1843), nec Benth. (1844).—*Parosela Hemsleyana* Rose in Contrib. U.S. Nat. Herb. **10,** 104 (1906); Rydb. *l.c.* 86; Standl. *l.c.* 463.

A very distinct-looking species, represented at Kew by two sheets (*Parry and Palmer* 154, and *Schaffner* 285) from San Luis Potosi.

Dalea hospes (*Rose*) *Bullock*, comb. nov.—*Parosela hospes* Rose in Contrib. U.S. Nat. Herb. **12,** 272 (1909); Rydb. *l.c.* 85.

Represented at Kew by three sheets from Nuevo Leon (including a sheet of the type collection),—*Palmer* (1880) 210, *Pringle* 1904 and *Pringle* 11417.

Dalea leporina (*Ait.*) *Bullock*, comb. nov.—*Psoralea leporina* Ait. Hort. Kew. **3,** 81 (1789).—*Parosela leporina* (Ait.) Rydb. *l.c.* 78,

cum syn.—*Dalea alopecuroides* Hemsl. Biol. Centr.-Amer. Bot. **1,** 237 (1880), non Willd. (1803). *D. leporina* Ait. ex Hemsl. *l.c.* in syn.

State of Mexico. District of Temascaltepec: Cajones, 2480 m., Sept. 1932 (fl.), *Hinton* 1686, "herb 1·5 m. high"; Mesón Viejo, 2830 m., on a hill, near oaks, Oct. 1932 (fl.), *Hinton* 1888; San Lucas, May 1935 (fr.), *Hinton* 7786.

Dalea minutiflora (*Rose*) *Bullock*, comb. nov.—*Parosela minutiflora* Rose in Contrib. U.S. Nat. Herb. **8,** 306 (1905); Rydb. *l.c.* 58 (1919).

Represented at Kew by a sheet of the type collection, *Pringle* 8721, from Yautepec, State of Morelos.

Dalea oaxacana (*Rose*) *Bullock*, comb. nov.—*Parosela oaxacana* Rose in Contrib. U.S. Nat. Herb. **10,** 104 (1906); Rydb. *l.c.* 101 (1920); Standl. *l.c.* 459.

Represented at Kew by a sheet of the type collection (*Pringle* 4961), from Sierra de San Felipe, Oaxaca.

Dalea Painteri (*Rose*) *Bullock*, comb. nov.—*Parosela Painteri* Rose in Contrib. U.S. Nat. Herb. **10,** 105 (1906); Rydb. *l.c.* 111; Standl. *l.c.* 456.

Represented at Kew by a sheet of the type collection (*Pringle* 10027), from the hills near San Juan del Rio in the State of Queretaro.

Dalea peninsularis (*Rose*) *Bullock*, comb. nov.—*Parosela peninsulare* Rose in Contrib. U.S. Nat. Herb. **8,** 304 (1905).—*P. peninsularis* Rose; Rydb. *l.c.* 53 (1919).—*Dalea canescens* Benth. Bot. Voy. Sulph. 12 (1844), non Martens et Gal (1843).

Baja California. Magdalena Bay (fl.), *Barclay*. Topo, Oct. 1882 (fl.), *Orcutt* 637.

Dalea pilifera (*Rydb.*) *Bullock*, comb. nov.—*Parosela pilifera* Rydb. *l.c.* 75 (1920).

State of Mexico. Comunidad, District of Temascaltepec, 2440 m., on the llano, Oct. 1933 (fl.), *Hinton* 4880, "flower purple."

The type of this species (*Purpus* 1741, from Pachuca, Hidalgo) is not represented at Kew. The above identification is based on *Rose and Painter* 7143, 7220 and 7850, all of which were distributed from the U.S. National Herbarium as *Parosela pilifera* Rydb.

Dalea pilosissima (*Rydb.*) *Bullock*, comb. nov.—*Parosela pilosissima* Rydb. *l.c.* 91; Standl. *l.c.* 461.

A very distinct species, probably forming low cushions, and bearing short capituliform racemes on almost leafless simple or sparingly branched peduncles. It is represented at Kew by a sheet of the type collection, *Palmer* (1896) 880, from Durango.

Dalea polycephala (*Rydb.*) *Bullock*, comb. nov. — *Parosela polycephala* Rydb. *l.c.* 90; Standl. *l.c.* 464.—*Dalea polycephala* Benth. ex Hemsl. Biol. Centr.-Amer. **1,** 244 (1880), nomen nudum; Rydb. *l.c.* in syn.; Standl. *l.c.* in syn.

A species apparently confined to San Luis Potosi. *Hartmann* 634, from Chihuahua, distributed as "*Dalea polycephala* Benth." certainly belongs to some other species.

Dalea roseiflora (*Rydb.*) *Riley* in Kew Bull. 1923, 337.—*Parosela roseiflora* Rydb. *l.c.* 105; Standl. *l.c.* 457.

STATE OF MEXICO. Nanchititla, District of Temascaltepec, in oak woods, Dec. 1933 (fl.), *Hinton* 5340.

This species was known previously only from the type collection (*Seemann* s.n. in Gray Herb., dupl. in Kew Herb.) from the Sierra Madre. Rydberg (*l.c.*) places the *locus classicus* in Sinaloa or Durango, but Mr. Hinton's rediscovery of the species indicates that it may be further south.

Dalea Saffordii (*Rose*) *Bullock*, comb. nov.—*Parosela Saffordii* Rose in Contrib. U.S. Nat. Herb. **12**, 273 (1909); Rydb. *l.c.* 107; Standl. *l.c.* 457.

Represented at Kew by a small portion of the type collection (*Palmer* (1880) 208), from the Sierra Madre. The *locus classicus* is said to be in Coahuila, and the species occurs in that State and in Durango.

Dalea spiciformis (*Rose*) *Bullock*, comb. nov.—*Parosela spiciformis* Rose in Contrib. U.S. Nat. Herb. **8**, 303 (1905); Rydb. *l.c.* 51 (1919).

STATE OF MEXICO. District of Temascaltepec; Plaza de Gallos, about 950 m., in water, Sept. 1932 (fl.), *Hinton* 1755; Rincón del Carmen, 1340 m., Oct. 1932 (fl.), *Hinton* 1938.

The name *Dalea spiciformis* Rose appeared on the label of *Pringle* 10059, collected on the hills near Los Amates Station, Guerrero in September, 1905. The label also bears the legend "type locality." The *locus classicus*, however, is Iguala, and the type collection, *Pringle* 9255, is not at Kew. Mr. Hinton's specimens represent an extension of range.

Dalea submontana (*Rose*) *Bullock*, comb. nov. — *Parosela submontana* Rose in Contrib. U.S. Nat. Herb. **8**, 306 (1905); Rydb. *l.c.* 59 (1919); Standl. *l.c.* 454.

STATE OF MEXICO. District of Temascaltepec: Rincón, Dec. 1931 (fl.), *Hinton* 124; Temascaltepec, Nov. 1932 (fl.), *Hinton* 2354, "plant 1·5 m. high"; Rincón del Carmen, 1340 m., in woods, Nov. 1932 (fl.), *Hinton* 2692, "2 m. high"; Cajones, in the lower oak belt, Nov. 1935 (fl.), *Hinton* 8658.

Dalea tehuacana (*Rydb.*) *Bullock*, comb. nov.—*Parosela tehuacana* Rydb. *l.c.* 113 (1920); Standl. *l.c.* 455.

STATE OF MEXICO. Villa Neda, District of Temascaltepec, March 1935 (fl., fr.), *Hinton* 7564, "shrub 1·5 m. high."

No other material of this species has been seen. Mr. Hinton's specimen, however, agrees well with Rydberg's description.

Dalea unifoliolata *Robins. et Greenm.* in Proc. Amer. Acad. **29,** 383 (1894).—*Parosela unifoliolata* (Robins. et Greenm.) Rose in Contrib. U.S. Nat. Herb. **8,** 303 (1905); Rydb. *l.c.* 60 (1919).

STATE OF GUERRERO. Coyuca, "in ripa fluminis Balsas," May 1934 (fl.), *Hinton* 6035. Zihuagio, District of Mina, in oak woods, Oct. 1936 (fl.), *Hinton* 9719.

This species was previously represented at Kew by a sheet of the type collection from Teguila, State of Jalisco (*Pringle* 4585). It is one of the most easily recognizable species of *Dalea*, on account of its rounded, unifoliolate leaves.

XXIII—NOTES ON CAREX: VII.* E. NELMES.

C. ATRATA L. AND ITS ALLIES.

Carex atrata L., as interpreted by Kükenthal in Engler's Pflanzenreich, 1909, 396–98, is a subarctic and alpine plant of Europe, Asia and America, with its southern limits in the Pyrenees and the Balkan mountains, the high lands of Armenia and Turkestan, and the Rocky Mountain States of America.

Kükenthal attaches to *C. atrata* three subspecies and a considerable number of varieties and forms. Some of these are discussed in this Note.

C. atrata L. var. *aterrima* (Hoppe) Kükenth.

This plant was described by Hoppe in 1815 as a species from the "höchsten Alpen von Salzburg und Kärnthen." It appears to form a link between *C. atrata* itself and certain Asiatic representatives, including one from India and two from China which are described farther on in this paper.

Kreczetowicz, the leading Russian specialist in the *Cyperaceae*, has described three new relatives of *C. aterimma* Hoppe in his recently published account of the family in the Flora URSS, **3** (1935). One of these is *C. perfusca*, with which its author associates some of the Siberian plants included by Kükenthal under var. *aterrima*. Another is *C. aequivoca*, a Caucasian plant with smaller spikes and utricles than the others. The third, *C. decaulescens*, from western Thian Shan, is placed near *C. caucasica* Stev., a species discussed below. Kükenthal's Caucasian citations under var. *aterrima* had already been abstracted into *C. Medwedii* Lesk. in Journ. Bot. Russ. **16,** 70 (1931).

This modern treatment of these *Atratae*, therefore, appears to restrict *C. aterrima* Hoppe to Europe.

C. atrata L. subsp. B. *atratiformis* Britton.

Kükenthal's first subspecies under *C. atrata* is Britton's *C. atratiformis*, a plant of the eastern American States. Mackenzie, in his recent revision of the North American Carices (North American Flora, **18,** 372, 1931–35) gives it specific rank.

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*Continued from K.B. 1939, 159.

C. atrata L. subsp. *C. caucasica* Stev.

In this second subspecies Kükenthal includes plants from the Caucasus, the Urals, Thian Shan, Turkestan and Kashmir.

I have not seen the type specimen of *C. caucasica*, but two sheets of recent gatherings in the Caucasus, determined as that species by Kreczetowicz, have recently come to Kew from Leningrad. These plants are specifically distinct from those collected by C. B. Clarke in Kashmir and cited by Kükenthal. The utricles of *C. caucasica* have a shining, puncticulate surface, and a very short but distinctly bidentate beak. Those of the Kashmir plant have an opaque, papillose surface, and a longer, truncate, scarcely bidentate beak. This plant appears to me to have a closer affinity with *C. aterrima* than with either *C. atrata* or *C. caucasica*.

Carex nigerrima *Nelmes*, sp. nov. ; affinis *C. aterrimae* Hoppe, sed culmis longioribus, foliis angustioribus, squamis angustioribus magis acuminatis, utriculis obovatis stramineis, rostratis brevioribus differt.

Rhizoma breviter stoloniferum. *Culmi* 60–70 cm. longi, superne scabridi, triquetri, inferne foliati, basi vaginis aphyllis purpureo-brunneis circumdati. *Folia* 3–4 mm. lata, culmis breviora, plana, attenuata. *Spicae* 5, suprema gynaecandra, ceterae plerumque omnino femineae, interdum basi breviter ramosae, subfastigiatae, cylindricae, 1·5–2·5 cm. longae, crassae, densiflorae, cernuae, superiores subsessiles vel breviter pedunculatae, inferiores longe vel longissime pedunculatae, angulis valde scabridis. *Bracteae* inferiores foliaceae, inflorescentiam multo superantes, superiores breves et squamiformes, vix vaginantes. *Squamae femineae* oblongo-lanceolatae, carinatae, acuminatae, inferne atropurpureo-rubrae marginibus albo-hyalinae, superne atro-purpureae. *Utriculi* inferiores squamis breviores, superiores squamas superantes, plerumque multo latiores, circiter 4 mm. longi, 2–2·5 mm. lati, obovati, tenuiter plurinerves, dense papillosi, anguste marginati, subcompresso-trigoni, straminei, vix stipitati, in rostrum brevissimum teres atro-purpureum ore truncatum integrum abrupte contracti. *Stigmata* 3.

India. Kashmir : Barzil, 3390 m., 28 July 1876, *Clarke* 29,722 (type) ; Sind Valley, 3600–3900 m., August 1895, *Ward* ex Herb. Duthie 17,825.

C. atrata L. subsp. D. *pullata* (Boott) Kükenth.

The third of Kükenthal's subspecies is based on *C. atrata* var. *pullata* Boott, and he places in it plants from the Himalayas, eastern Tibet, and China. Ohwi (Cyperaceae japonicae, 1936) records it from Formosa.

There is no doubt in my mind that the Himalayan plants cited by Kükenthal are specifically distinct from other members of the *Atratae*. They were raised to specific rank by C. B. Clarke in 1898 as *C. Duthiei*.

Some of the more eastern plants may belong to *Carex Schneideri*, a new species described below. The utricles of this species have no trace of the dark colouring which tinges those of *C. Duthiei*. They also differ in being very distinctly beaked, and their peduncled spikes contrast strongly with the subsessile contiguous ones of the other plant.

One of my citations under *C. Schneideri* is Pratt 556, the Kew and Herb. Boiss. representatives of which Kükenthal places under his subsp. *pullata*, var. *glacialis* (Boott) (he points out that the *Pratt* 556 at Paris is *C. melanantha* var. *Moorcroftii*, and the one at Brit. Mus. *C. atro-fusca*).

Pratt's plant at Kew is a fairly robust one of about 80 cm. in height; very different from *C. atrata* var. *glacialis* Boott, which Kükenthal himself describes as "Culmus humilis. Spiculae abbreviatae." C. B. Clarke wrote up Pratt's plant as "*C. Duthiei* C. B. Cl. forma 'pedunculosa'."

Carex Schneideri *Nelmes*, sp. nov.; affinis *C. Duthiei* C. B. Cl., sed spicis majoribus pluribus et longius pedunculatis, utriculis pallidioribus et rostratis differt.

Culmi 60–80 cm. longi, subvalidi, subrigidi, angulis scabridis, foliati, triquetri, basi vaginis aphyllis nitidis atro-purpureis circumdati. *Folia* 5–6 mm. lata, culmis breviora, plana, attenuata. *Spicae* 4–6, fastigiatae, cylindricae, cernuae, 2–3 cm. longae, densiflorae, superiores 3–4 gynaecandrae, inferiores femineae, superiores breviter inferiores longe vel longissime pedunculatae, pedunculis scabridis. *Bracteae* inferiores subfoliaceae, inflorescentiam aequantes vel superantes, superiores breves et squamiformes, vix vaginantes. *Squamae* atro-purpureae, anguste oblongo-lanceolatae, acuminatae, acumine pallido. *Utriculi* squamis aequilongi vel eo paullo breviores et latiores, 3–4 mm. longi, anguste oblongo-elliptici, subinflato-trigoni, indistincte plurinerves, puncticulati, glabri, clare pallide flavo-virides, vix stipitati, in rostrum breve teres laeve atro-purpureum ore integrum subabrupte desinentes. *Stigmata* 3.

China. Yunnan: near Lichiang, in alpine meadows of the snow mountains, c. 3800 m., 6 August 1914, *Schneider* 2138 (type).

Szechwan: west Szechwan and Tibetan Frontier, chiefly near Tachienlu, at 2700–4050 m., *Pratt* 556; Sungpan Hsien, in thickets, 8 August 1928, *Fang* 4053; north Szechwan, Dongrergo, in an alpine meadow, 7300–7700 m., 20 July 1922, *H. Smith* 3818.

Finally is described a species from China which, though having close affinities with the *Atratae* discussed in this paper, bears also some relationship to *C. nivalis* Boott and *C. atro-fusca* Schkuhr, species belonging to the Section *Frigidae* Fries.

Carex kansuensis *Nelmes*, sp. nov.; affinis *C. aterrimae* Hoppe, sed culmis longioribus, squamis atro-purpureis et acuminatis, utriculorum rostris oblique sectis et inaequaliter bilobis differt.

Rhizoma caespitosum. *Culmi* 70–108 cm. longi, validi, superne scaberuli et curvati, triquetri, inferne foliati, basi vaginis aphyllis purpureo-brunneis circumdati. *Folia* 5–7 mm. lata, culmis multo breviora, plana, rigidula, longe attenuata. *Spicae* 4–6, superiores gynaecandrae, inferiores femineae, subfastigiatae, oblongo-cylindricae, 1·5–2·5 cm. longae, crassae, densiflorae, cernuae, superiores subsessiles vel breviter pedunculatae, inferiores longius pedunculatae, pedunculis laevibus. *Bracteae* inferiores breviter subfoliaceae, culmis breviores, superiores breves et squamiformes, vix vaginantes. *Squamae* femineae anguste oblongo-lanceolatae, atro-purpureae, marginibus anguste albo-hyalinae, tenuiter carinatae, acuminatae, acumine pallido ; masculae marginibus late albo-hyalinae. *Utriculi* squamis plerumque aequilongi sed iis multo latiores, 4 mm. longi, circa 2·5 mm. lati, late ovato-elliptici vel suborbiculati, valde compressi, leviter concavi, tenuiter membranacei, albido-ferruginei, enerves, superne dense papillosi marginibusque parce ciliata, vix stipitati, in rostrum breve tenue atro-purpureum oblique sectum et inaequaliter bilobum ore albo-hyalinum acutum abrupte contracti. *Nux* oblongo-elliptica vel oblongo-obovata, obscure trigona, rostrata. *Stigmata* 3, leviter inclusa.

China. Kansu : western Kansu, 10 July 1918, *Licent* 4232 (type) ; southwestern Kansu, October 1925, *Rock* 13,726.

Szechwan : northwestern Szechwan, about 50 km. towards the south-west from Merge, in a wet meadow, c. 3500 m., 3 September 1922, *H. Smith* 4312.

XXIV—MISCELLANEOUS NOTES.

Cockayne Memorial Garden.—A memorial garden to the late Dr. Leonard Cockayne, F.R.S., has been created in the Botanic Garden, Christchurch, New Zealand, and was opened by Prof. Carl Skottsberg on 4th November, 1938, in the presence of Mr. H. Kitson, Chairman of the Domains Board, Dr. F. W. Hilgendorf, President of the Canterbury branch of the Royal Society of New Zealand, and a large gathering.

In the course of his address Prof. Skottsberg paid the following very apposite tribute to Cockayne's work :—

" What Cockayne means to New Zealand botany and horticulture cannot, I am afraid, be adequately expressed in few words, because his activities were so manifold and so wide-ranging, but I shall venture to emphasise one side which is, in my opinion, of supreme importance. In these young dominions beyond the seas, created by a marvellously enterprising nation, the greatest modern history has known, science has, in the beginning and as a rule for a considerable length of time, been, as it were, administered from the mother country, and travellers from many lands have come to harvest and have returned laden with Nature's treasures, whereas few have stayed to become faithful servants to the new country. I believe this is a fairly true picture of what happened here. Cockayne was

one of those who shifted the management of New Zealand botany from the old countries over to New Zealand itself, and he became the man who definitely made it a national science. To him, botany did not mean simply listing species and tagging Latin names to them. He went to the living thing ; he introduced modern plant ecology ; the science of the plant in relation to its surroundings, past and present, into New Zealand, not to become an inanimate copy of other people's views, forced upon a new and strange world, but as an original structure, enriched and flavoured by his masterly mind. This work of his made him famous here and naturally so, and we, who work in other countries, soon came to look upon him not only as the outstanding figure in New Zealand botany, but also as a master whose influence on the progress in ecology was felt far and wide."

Diseases of Fruit and Hops.*—In 1920 Mr. P. J. Fryer published a work for practical growers entitled " Insect Pests and Fungus Diseases of Fruit and Hops." Since then new diseases have been recognized and much additional knowledge has accumulated. Dr. A. M. Massee recently dealt with insect troubles in " The Pests of Fruit and Hops " and now Dr. Wormald has produced a valuable companion volume in which the diseases caused by fungi, bacteria, and viruses are described, as well as so-called " physiological " disorders. With these two works the grower is well equipped with means to identify the pests and diseases which he may encounter and with information as to how to deal with them.

The various diseases are grouped according to host-plants, and then under the various organs attacked, as roots, stems, leaves, flowers and fruit. In each of these categories the arrangement of the diseases described appears to follow no particular order. There are two introductory chapters, the first giving a brief but clear exposition of the factors conducive to health and disease in plants, and the second an account of fungicides and their application. A third chapter deals with diseases which affect a number of different plants, such as Armillaria root rot, silver leaf, and coral spot (*Nectria cinnabarina*). Two chapters are devoted to diseases of the apple, one to pear, quince and medlar, two to stone fruits, and four to diseases of soft fruit. Then follows a chapter on diseases of the grape-vine, fig, mulberry and walnut, and one on diseases of hops. Finally there is a short chapter giving notes on some serious diseases not yet recorded in Britain.

Full descriptions of the symptoms of the various diseases are given, and the book is well provided with clear figures from photographs showing characteristic appearances. The photographs of apple and pear scab on the fruit for instance are particularly good and recognisable by even the least experienced of growers.

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* " Diseases of Fruit and Hops." By H. Wormald. Crosby Lockwood & Son, Ltd., 1939. Pp. 290, 40 plates uncol., 24 text-figures. Price 17s. 6d. net.

Since the book is intended primarily for growers the author has not given long or detailed accounts of the life-history of the pathogenic fungi concerned. In the case of the more common diseases there is, however, sufficient information, together with occasional text-figures showing spores, etc., to enable the reader who is possessed of a microscope to confirm the diagnosis he may have made from symptoms. In addition the most up-to-date methods of control are explained, and the work will certainly be most useful to students and advisers in horticulture as well to growers. References are given to other important literature for those who wish to read further.

The format is attractive, with clear print and easily picked out headlines. It is obvious that the proof-reading has been done with Dr. Wormald's well-known care and thoroughness, for the only error the writer has found is one which seems to be due to a misconception of the author, since it occurs both on p. 10 and in the index—namely, the spelling of Mr. Carleton Rea's name as Rae.

Both author and publishers are to be congratulated on the appearance of this attractive and useful volume.

E. M. WAKEFIELD.

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